The Canadian
Medical Association Journal

Vol. XXVIII TORONTO, MARCH, 1933 No. 3

An Address
ON
THE SOURCE OF MODERN MEDICINE*

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GENTLEMEN: I must trouble you with a date, 1685, the year in which Charles II died. That reign marks the watershed between the mediæval and the modern world; between the mass and the individual; between authority and experience; between books and experiment. From that summit the spring of modern medicine burst forth.

It was in reality a new world. The Royal Society had been founded; the circulation of the blood had been proven; the Cartesian method had been disclosed; the universal law of gravity and the laws of planetary motion had just been announced. Logarithms, electricity, magnetism, chemistry were words coming into common use.

Up to that time, the authority in science was Aristotle; in philosophy, Thomas; in medicine, Galen. All three had organized and synthetized the existing knowledge of their day. It was a useful task; but when life is too closely organized it begins to perish. The body of knowledge then becomes a burden, a tradition; it blinds men's eyes; it makes them incapable of observation or thought. It enslaves them; but, suddenly, freedom asserts itself. Freedom too has perils, but they are less dangerous than the perils of slavery. One can now say what he likes, even in medicine, no matter how foolish; there will be plenty to contradict him.

There were reasons deeper still for the scientific renascence of the period under review. The divine right in science of Aristotle and the Greeks had passed; the divine right of kings in politics perished at the hand of Cromwell; the divine right of Galen in medicine came to an end with the appearance of Thomas Sydenham; and so we have come to our subject at last.

For a perfect sight of the old medicine, let me conduct you to the bedside of Charles II: With a cry he fell. Dr. King who, unfortunately, happened to be present bled him with a pocket-knife. Fourteen physicians were quickly in attendance. They bled him more thoroughly; they scarified and cupped him; they shaved and blistered his head; they gave him an emetic, a clyster, and two pills. During the next eight days they "threw in" 57 separate drugs; and, towards the end, a cordial containing 40 more. This availing nothing, they tried Goa stone, which was a calculus obtained from a species of Indian goat; and as a final remedy the distillate of human skull. In the case report it is recorded that the emetic and the purge worked so mightily well it was a wonder the patient died. One physician did protest that they would kill the king; and out of this arose the suspicion that he had been irregularly poisoned. But he did die, "as peaceable as a lamb"; his last words were, "Do not let poor Nellie starve."

Whilst this mediæval practice was in progress at the palace, not far away, on the north side of Pall Mall, looking south over St. James's Park, opposite to Nellie's, and quite near the house of Moll the dancer, lived Thomas Sydenham. But he was not called to the royal bedside. He was a Puritan; he had been a captain of horse in the parliamentary army; and, worse still, he was reputed to be practising medicine "in a new way". Out of his specifically creative mind modern medicine was already emerging by this new way.

* Delivered before the American College of Physicians, Montreal Meeting, February 8, 1933. Published by agreement with *The Annals of Medicine.*

His method was no secret. Twenty years ago, he had published his method of curing fevers; he was ready to publish his Observations, a series of five letters addressed to friends: "about the sum of all I know of the cure of disease up to the day on which I write, namely, the 29th September, 1686". He died three years later. A collection of letters to his son was issued after his death. That is all. He lies buried in the church of St. James's, Piccadilly, where a mural tablet was put up by the Royal College of Physicians in 1810. It bears the inscription adapted from Horace, *Medicus in omne aevum nobilis*,—a physician famous for all time.

The most casual reading of his little books reveals the method. There is no dogma, no system, no body of doctrine, merely a few general principles. It is not a method even; it really indicates a way of looking at things, without searching too curiously into their causes. He looked upon diseases as they appeared to him, and made a complete study of each.

Most forms of disease, he thought, had a definite and uniform type due to the uniformity of the cause. He sought only for the "evident and conjunct causes"; the remote ones he thought it vain to seek. Acute disease he considered to be a reaction of the body to meet some injurious influence coming from without. He was content to watch and aid in the natural crisis. Chronic diseases were in the main due to errors in diet and in the general way of life. As he put the case, "Acute disease is an act of God; of chronic disease the patient himself is the author."

Fever was nature's engine against the enemy, or her handmaid for removing the morbific material from the blood. Fever was a sign that nature was curing the disease, and should not be curbed unless it becomes too violent. The patient should be lightly covered; he should be allowed air and light, with water if he was thirsty, and food only when his appetite demanded it.

To do without hypotheses, and study the actual disease with an open mind; to make an unbiased study of the natural processes in health and disease; to trust in the healing power of nature—for nature is the mother and healer of us all—and provide help only when help was demanded,—that was his re-discovery, for the original discovery had been made by Hippocrates himself.

He demanded that a physician should regard disease with the eye of a naturalist, and describe it with equal care. "If only one person in every age," he said, "had accurately described and habitually cured only one single disease, and disclosed his method, physic would not now be where it is." Every hypothesis must be abandoned, whilst every phenomenon of disease is being minutely observed; "but it is right and necessary to distinguish between the constant characteristics of a disease and those that are merely accidental and adscititious. Want of accuracy in distinguishing diseases that are apparently similar is fatal to medicine."

Sydenham, of course, had his own theories; but he was never enslaved by them. Still less was he enslaved by classical dogma or by the chemical theories then in vogue. He made his own the great saying of his favourite, Bacon: We have not to imagine or to think out, but to discover what nature does. These are the very words that Hunter addressed to Jenner, Do not think—try.

In practice Sydenham did not disdain the use of drugs; he used Peruvian bark freely, as well as laudanum which he was the first to prepare; but he had many cases, "in which he consulted his patient's safety and his own reputation most effectually by doing nothing at all." It was a great mistake, he declared, to suppose that nature always needed the assistance of art. His friend, John Locke, the philosophical father of Hume and Kant, himself a captain in the army of the parliament, and a practising physician as well, in commending the new method writes to a friend, "You cannot imagine how far a little observation will carry a man in the curing of disease, though very stubborn and dangerous, and that with very little and common things, and almost no medicine at all."

Too much has been made of Sydenham's contribution to the diagnosis of disease. True, he distinguished between chorea and St. Vitus dance; he described syphilis, and recognized many diseases as specific in the modern sense; he established hysteria as a definite disease; his description of gout remains unexcelled. It was from that malady he suffered and died; but he consoled himself with the reflection, that fools rarely suffer from it, unless indeed he himself might have been an exception He missed many of the symptoms of scarlatina; and his classification of fevers remains obscure.

It was in practice he excelled. For a patient who had suffered from the prevailing lowering treatment he prescribed a roast chicken and a pint of canary wine. A hypochondriac he advised

to consult a physician in Inverness. The man proceeded on horseback; he could not find the doctor; he returned very angry but cured. "Nothing," Sydenham said, "so cherishes and strengthens the blood and spirits as riding a horse."

In addition to all this, there was in Sydenham, as there was in Hippocrates, in Pasteur, and in Lister, a powerful moral element which shines on every page. "Whoever," he wrote, "applies himself to medicine ought seriously to consider: first, that he will one day have to render an account to the Supreme Judge of the lives of the sick committed to his care; and next, that whatever skill or knowledge he may, by divine favour, possess should be devoted above all else to the glory of God and the welfare of humanity." And again, "the physician will care for the sick with more diligence and tenderness if he remembers that he himself is a fellow-sufferer."

Sydenham created no great stir in London. To the end of his days he remained on the outside of the faculty, although he had his friends within and without, and in that Invisible College which was the precursor of the Royal Society. To us who are alert for any new method the conduct of the profession towards Sydenham seems strange: For thirty years he was described as a "sectary". In one of the few letters now extant, written in English, he admits that, "whilst he has the happiness of curing his patients, some of the faculty take fire at his attempts to reduce practice to a greater easiness." In another letter he utters a mild protest against those who make it a matter of reproach, if one brings forward anything new, which had not previously been said, or heard, by themselves.

But the profession must not be too severely blamed. We are so often right in our scepticism, we may be forgiven when we are occasionally wrong. And Sydenham was quite "irregular". He practised in London until he was forty years old without a license of any kind. In 1663 he was admitted licentiate by examination of the Royal College of Physicians, which is the lowest rank. It was not until 1676 that he acquired the doctor's degree, not from Oxford but from Cambridge. He was at the time 52 years old, and his son was an undergraduate there. He is known to have had the degree of bachelor of medicine from Oxford, but there is no official record. In any case, his medical study must have been short, and not profound. To compensate, he is alleged to have taken a post-graduate course at Montpellier. There is no evidence of that either, although French writers make the most of the legend through the natural desire to claim him as their own.

Even his unlicensed practice was interrupted by an excursion into politics in 1658, when he became a candidate for parliament. He was unsuccessful; but as a defeated candidate he was appointed Comptroller of the Pipe, an office long since obsolete, and having to do with crown lands. More important, he was awarded 600 pounds on account of his military service. With this money in hand he married, and settled down to practise medicine.

Likewise, his study preliminary to medicine was brief. He entered Oxford at the age of eighteen; but after three months his career was interrupted by the outbreak of civil war. He joined the army in company with three of his brothers; he kept the field for four years, when he returned to the University, and received an academic degree in 1646. Two years later, after his return from the second civil war, he was made Bachelor of Medicine by "actual creation". It was an honorary degree given in advance of the study for a profession which he entered by the influence of "a great man and by his own destiny."

It was quite natural, therefore, that he should be considered in London as an uneducated and unqualified person. He could not write Latin, although he could read it; his writings must be translated for him, and the work was badly done. Only rough notes in his own English remain, and it is without especial quality. Although his pre-medical education was deplorable, he was not an ignorant man. He could speak Latin. Cicero was the author he most admired, "the great teacher both in thought and language." He frequently quotes Homer, Theocritus, Virgil, Horace, Juvenal, Seneca; and all modern Latin writers were known to him, especially Bacon and Erasmus. He knew the English Bible, which was then a new book.

It was from Edinburgh and Leyden the fame of Sydenham first extended to the world. Boerhaave described him as the light of England, an Apollo in the art of medicine, a true pattern of the Hippocratic physician. Haller, a pupil of Boerhaave, who carried Sydenham's method to Germany, discovered him as the beginning of a new epoch in medicine. Van Swieten, a fellow-pupil, bore the seed to Vienna, where it developed into a great clinical school. Arbuthnot in the

Harveian oration for 1727, found in him the "æmulus" or emulator of Hippocrates; and more recently the beloved Dr. John Brown describes him as the prince of practical physicians.

This Boerhaave was professor of medicine in Leyden where he succeeded "Sylvius", who had made a vain attempt to reconstruct medicine upon a basis of the new chemistry and the circulation of the blood, losing himself in the technical and the mechanical. Boerhaave lectured five hours a day; his hospital contained only twelve beds, but by Sydenham's method he made of it the medical centre of Europe. That knowledge came to him through Edinburgh from Archibald Pitcairne, who for a short time occupied the professor's chair in Leyden, and was the teacher of Boerhaave.

This Archibald Pitcairne was born in Edinburgh in 1652. His ancestor fell at Flodden with his seven sons. The family was continued by a posthumous child. He entered Edinburgh University in 1668, where he graduated Master of Arts in 1671, at the age of nineteen. Then he studied divinity and law. In Paris, where he went for his health, he began the study of medicine but soon returned to Edinburgh, and took up the study of mathematics and medicine. Once more he went to Paris, and graduated doctor of medicine at Rheims. He practised in Edinburgh with wide success, and in 1692 he went to Leyden to occupy a professor's chair. Two of his pupils were Boerhaave and Meade. In 1693 he returned to Edinburgh for his marriage to the daughter of an eminent physician, Sir Archibald Stevenson, from which place he often went as consultant to England and Holland.

Lacking the means of anatomical study, he persuaded the town council to permit him and some of his medical friends to dissect the bodies of paupers in Paul's Work, unclaimed by their relatives. The persuasion was easy, as they agreed to bury the bodies after dissection at their own charge, and to save the town from that expense. To this was added the somewhat dangerous provision, that they were to attend the patients free of cost to the town until they died. This was the origin of the Edinburgh school of medicine.

Anatomy has been the origin of every school of medicine. Human dissection is even yet the sovereign method of transforming the average layman into a physician. To this rule neither Hippocrates nor Sydenham is an exception. They did not dissect; but they were men of genius; and genius knows no law. Besides, they did not found schools. The fame of every school, McGill included, is based upon anatomy. It was fixed by Shepherd. I pause to utter a word of respect to his memory. In the modern sense he was not a teacher; but he compelled men to learn by the sheer drudgery of dissection,—dissection not of earth-worms, frogs, rats or guinea-pigs, but of the human body. To him the human body, living or dead, was the primary unit in medicine; and in those days the ward-bed and the dissecting table were not very far apart. Indeed, as Sir John Bland-Sutton reminds us, the word κλίνη, from which "clinical" is derived, applies equally to a bed and to a table.

I am well aware that in these days, when a student must be converted into a physiologist, a physicist, a chemist, a biologist, a pharmacologist, and an electrician, there is no time to make a physician of him. That consummation can only come after he has gone out into the world of sickness and suffering, unless indeed his mind is so bemused, his instincts so dulled, his sympathy so blunted by the long process of education in those sciences that he is forever excluded from the art of medicine which was to Hippocrates "the art" of all arts. In that case he is destined for the laboratory, the professor's chair, or the consultant's office. What would have happened to Sydenham, had he been put through this machinery is a problem in infinity which no human intelligence is competent to solve.

Pitcairne, like Sydenham, insisted upon the strictly scientific method long since enunciated by Bacon: an exact compliance with observation and experience. "Nothing," he affirms, "more hinders physic from being improved than the curiosity of searching into the virtues of medicine; but to enquire whence they have that power is a superfluous amusement, since nature lies concealed. A physician ought therefore to apply himself to discover by experience the effects of medicines and diseases, and not needlessly fatigue himself by enquiring into their causes which are neither possible nor necessary to be known." This is going too far; but we must agree that undergraduates in medicine and practitioners should be debarred from this "superfluous amusement."

Both Sydenham and Pitcairne were convinced that nature lies concealed, and always will be concealed. The more we seek, the further she recedes. To pluck out the heart of her infinite mystery was to them a vain task, and the seeker

was sure to go astray. Nature knows no law. The laws of nature were merely our own presuppositions.

Pitcairne was also a poet, a mathematician, a scholar, a collector of books. His library was acquired by Peter the Great of Russia. His monument in Greyfriars churchyard bears an epitaph in testimony of his generosity to scholars. He was the first champion of Harvey. He too failed to win the approval of his colleagues; his plan for dissection was strongly opposed. His way of life was equally disapproved by the Calvinistic Edinburgh. If we can believe his detractors, he was a frequenter of clubs, public-houses, and taverns. He is reputed to have been drunk twice a day; an unbeliever; much given to profane jests; an atheist; involved in quarrels with the faculty, and suspected by the government.

A curious evidence of his quality is supplied by Richard Mead, his pupil along with Boerhaave at Leyden, afterwards court physician to George II, better known as the discoverer of the *sarcoptes scabiei*, the insect that causes the itch. Pitcairne's son was out in 1715, and was condemned to death. Mead in gratitude to his master interposed and saved his life. He pleaded with Sir Robert Walpole that if he and the royal family had been cured by his skill it was due to the instruction he had received from Pitcairne.

The intermediary between Pitcairne and Sydenham was Dr. Andrew Brown. He had read Sydenham's "new and quite contrary method". It so impressed him that he went to London "to settle his tossed thoughts". He spent "some months in his society", and found in him "everything that use to beget in wary and prudent people trust and knowledge." He returned to Edinburgh "as much overjoyed as if he had gained a treasure." He had; he published it to the world in 1691, "a vindicatory schedule concerning the new cure of fevers, first invented by the sagacious Dr. Thomas Sydenham." Pitcairne in the following year carried that treasure to Leyden.

Modern medicine had a resting stage in Edinburgh, whence it issued in two faint streams across the Atlantic to Montreal and Philadelphia. In 1821 the Montreal General Hospital was founded, and from it emanated the McGill medical school. This was the first hospital in America to introduce students into the wards. Here again the old and the new came into conflict. A duel was fought; men had conviction in those days. Five shots were exchanged with ounce bullets. One protagonist was shot through the chest; the other had his right arm shattered. Both recovered, the one by the old treatment, the other by the new, so their comparative merit was left undecided. The four founders were Edinburgh men.

When the College of Physicians of Philadelphia was founded in 1787, four of the eleven senior fellows had graduated from Edinburgh, and four others had studied there, "children of Edinburgh and grandchildren of Leyden," as Weir Mitchell said. There is in the Frick library a collection of 126 theses, presented by Sir William Osler, written by American students in Edinburgh between the years 1760 and 1813. Some of them bear the names of Morgan, who founded the first American medical school in the University of Pennsylvania in 1763; of Shippen, Kuhn, Logan, Rush, and Lee. The first clinical lecture was given by Thomas Bond in 1766, on the advantages of clinical instruction. He took the precaution of reading it in advance to the board of managers who inscribed it in their minutes. To complete the record, Osler in 1885 went to Philadelphia, bearing with him what he had learned at McGill; and so these two streams of modern medicine were joined.

If I stopped at this point I should be a mere historian repeating what you already know or can read in books. Sydenham's little writings are at your hand in Latin and English, published by the old Sydenham Society. Everything germane to the subject has been collected by Dr. F. Picard, and by J. F. Payne in 1900. From this material, small though complete as it is, many charming essays have been drawn, none more charming than that by H. H. Bashford in his Harley Street Calendar.

But history is the master to whom we all must go. If now we are convinced that Sydenham has achieved a world mastery in medicine we might do well to enquire how close we come to his mind, or how far we have departed from it. For the moment I shall content myself with one aspect—medical education—a subject upon which Sydenham expressed himself without reserve. We must not rely too implicitly upon even his authority for he had no experience in the public teaching of students; he never had a hospital appointment, never occupied a professor's chair. He had, however, some private pupils, one of whom was Dr. Dover whose powder yet bears his name. His own instruction at Oxford was scanty; he

never entered a laboratory; never walked through a ward; there were no wards to walk in. He mentions Aristotle only once, Galen three times, Celsus not at all.

If a young man were to ask you by what means he should achieve a medical education, you would feel compelled to offer him the curriculum for the first two years. They are much the same; they represent the sum of our wisdom. In one recently under my hand, the first year is assigned to physiology, anatomy, histology, and organogen; although if the aspirant asked me what "organogen" meant, I should be obliged to confess that I do not know; unless indeed it is derived from the Greek word ὄναγρος through the Latin *onager*. In the second year, biochemistry and pharmacology are added; with lectures on public health and the history of medicine. It is not on record that the neophyte comes into the remotest contact with a sick human being for two years. The London schools are within the hospitals, and students from curiosity or boredom wander with new interest and profit into the wards. The French go to the other extreme, and assign clinical duties to a student on the first day of his entrance.

This very question of medical education was put to Sydenham by Hans Sloane, who afterwards achieved the highest professional and social honours, and is yet remembered as the founder of the British Museum. The young man modestly suggested that he might take a course in anatomy and botany. "This is all very fine," said Sydenham; "but it won't do. Anatomy, botany,—Nonsense, Sir. I know an old woman in Covent Garden who understands botany better; and as for anatomy, my butcher can dissect a joint full as well. No, young man; all this is stuff: you must go to the bedside; it is there alone you can learn disease." Rather than go abroad to study botany, he recommended this earnest seeker to drown himself in a pond that was commonly used for that purpose. The frightful thing is that he may have been right.

Sydenham was a physician, an artist, a practitioner; he thought that enough for any one person. He was not an ultimate scientist, not a botanist, anatomist, or physiologist. These were separate trades; they concerned him indirectly or not at all; they destroyed in the practiser the quality of physician. He had a passion for curing the sick, which expelled all other interests.

He does not seem to have heard of Harvey or the circulation of the blood, which was then a discovery 40 years old. Osler goes further when he writes: "There was nothing in Harvey's discovery which could be converted immediately into practical benefit, nothing that even the Sydenham of his day could take hold of and use." He knew nothing of Malpighi's discovery of the arterioles twenty years earlier. Indeed he averred that not even the microscope could disclose them. These to him were explanations, and he kept his mind upon the majesty of open facts. He gave to medicine a method which was more valuable than detailed discovery; he brought canonical authority to an end. But, strange to say, this method was soon to be extended into those fields of science of which he professed himself negligent or ignorant. Boerhaave applied that method to anatomy, physiology, and the microscope. Haller bore it with him to Göttingen, and developed physiology into a natural science; Morgagni in morbid anatomy was "the counterpart of Sydenham."

If Sydenham in his mature age began to practise in any American city he would be put in gaol; if he applied with his poor prel minary qualification to study medicine in the first year of any medical school, he would be put in the asylum, along with Shakespeare, if he were found wandering about, after he had applied to a high-school as an instructor in English composition. We in Canada have been in the habit of blaming the United States for our established curricula. Forty per cent of our medical students at McGill are Americans; they help to pay our salaries, although they do profit to the extent of 600 dollars a year from our pious endowments.

In times gone by, Canadian graduates went freely to the United States to practise. We felt obliged to conform with the regulations of the various State boards; we still feel obliged in a measure to meet the legal needs of our American students. Now the border is more strictly closed. If an American physician comes to us, he comes on his own record since graduation. No one thinks of asking how or where Penfield, or Cone, or Stehle studied. If now our curricula are too abstract, the fault is our own. We have to deal only with the various provincial boards. The eye of the legislatures is upon them and upon us; and they are swift to act. One Canadian provincial board is much more rigid than any similar body in the United States. The final Report of the Commission on Medical Education, issued last month, discloses that all State regulations are completely relaxed, and the schools are now free. The head of one Board writes, that

licensing examinations, "as such," that is, apart from the candidate's school record, are worthless. Sydenham would sanction the profound sanity of this Report.

Let us now, in conclusion, try to discover if Sydenham's practice has any lesson for us. When he came upon the scene, practice had become so scientific that the most scientific physician did not even look upon his patients. In Paris their excretion was carried to him in an earthen vessel by a servant. By inspection of that alone he made a diagnosis, and sent the proper remedy. To be "elaborately curled" was a favourable sign. A similar practice prevailed in Scotland, if we can believe the panegyric of Robert Burns upon Doctor Hornbook, except that the mode of conveyance was upon a "kail-blade", that is, a cabbage leaf.

We in our time have departed still further from reality, when we substitute a photograph for the thing itself. The older surgeons were content to diagnose a broken leg if the end of the bone protruded through the skin. Now, we must have a picture. The fault is not wholly with the surgeon. The poorest patient is so hedged about with insurance that the surgeon must provide himself with the evidence the court may require. Nothing lies like the camera, especially when the deeper structures are involved. By a judicious use of the camera a fish may be made to appear as long as the man who caught it. In hospitals, given over mainly to chronic and convalescent cases, an expert photographer comes once a week to "read" the pictures that have been made in the interval by the "technicians". He makes the diagnosis and suggests the treatment, although he has never seen a patient *qua* patient since the day he acquired his degree.

If Sydenham were alive to-day and came into a modern hospital he would be for the moment bewildered. He would have to teach himself that the field of medicine has been immensely widened, and cannot even be surveyed by a single mind. He would see acute conditions diagnosed at a glance, and swift treatment applied. But he would see obscure cases which had baffled practitioners as earnest as himself. He would discover, to his joy, that the chief physician was so scientifically conscientious that he would not make a diagnosis, still less prescribe anything more than a palliative treatment, until he had before him all the reports of his various expert assistants. By the time the file was complete, the patient might have left the hospital alive or dead. If living, he might take his file with him, to display with the interest he had in his family album. But the visitor would recognize in that physician a brother to himself,—with this reserve, that the patient be not lost in the problem, or the physician in the abstract scientist. The world may be a stage: it is not a hospital, as the young man will discover when he begins to practise, deprived of apparatus, and compelled to rely upon his own natural senses.

Sydenham would be astonished at the magnificence of the modern hospital, and wonder if practice could not be reduced to a "greater easiness", thinking of the days when he fought his troopers and doctored them, too, as indeed the soldiers in the recent War were adequately treated in aid-post, dressing station, field ambulance, and in rest stations for their convalescence. He would ask, as many are now asking, who bears the expense of three dollars a day for each public patient, described in his time as a pauper.

Unless the hospitals for public patients curb their scientific curiosity and return to the simple practice of Sydenham their task will be taken away from them and given to another. Science, too, is governed by economic law. Even private patients are beginning to discover, as Sydenham did, that they can get well without becoming victims of the scientific ritual. Any patient who lives long enough will get well. Life is not now so desirable as it used to be. To die in peace is better than a few months of added misery.

Nature may be expelled; insensibly she returns. Happily, the tide of practice is now turning again to the bedside. The voice of Sydenham is being heard anew. To a patient clamouring for drugs and operation David MacKenzie said: "The quickest and cheapest way to recovery is lying in that bed." Sydenham said to Locke: "You will best cherish yourself by keeping to bed; it will contribute more to your relief than can be imagined." Dean Martin instructs his students that the educated hand and ear will tell the average physician enough, and all he can understand, towards treating a patient with heart disease. Electrical machinery is for the expert; he alone can tell if the fibrillations that appear upon the photograph are really in the heart or are due to extra-cardial electrical currents induced by a nearby radio or a vacuum cleaner in the hands of a ward-maid. John Meakins informs his students that the one question that really interests a patient is how soon he can resume his usual em-

ployment. Francis W. Peabody, six years ago, expounded to the students of Harvard the complete care of the patient.

Sydenham was a Puritan; he believed that scientific truth came as a revelation from heaven; or, as we would say, by an act of intuition in a creative mind. Experiments were of no avail, unless there was a mind to interpret them and discern the end to which they led. All else was mere research, searching for the already seen, or an aimless wandering in the mazes of nature. He made no objection to these experimenters. They might be as abstract and finical as they liked; he merely insisted that they know what they were trying to do, and above all keep out of the field of practical medicine, and not lead the minds of the young away from the bedside. There is a lesson in that for the laboratories.

Fame enough has come to Sydenham; but he had "long since weighed in a nice and scrupulous balance, whether it were better to serve men or be praised by them."

THE TREATMENT OF EXTERNAL CANCER BY RADIOTHERAPY*

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V.

THE discovery of radium in 1898-1900 was followed immediately by numerous experiments on plants and animals with a view to discovering what properties this new substance might possess. The fact that it might be useful in diseases of the human body became known one year later by reason of the now historic accident to the French investigator Becquerel who carried a tube of radium in his waistcoat pocket for some hours and received therefrom a severe radium "burn" on the skin underneath. As one writer has pointed out "The remembrance of this 'burn' is still so vivid that in the minds of many physicians, radium is only a synonym for burn." In the years which have elapsed, the biological reactions which follow the application of radium to the various tissues of the body, both in health and disease, have been very fully studied, and, while much remains yet to be investigated, we now know in great detail the nature of the changes which take place and are rapidly reaching a point where the field of usefulness of radium may be defined with accuracy.

It was quite natural that the earliest experiments with radium were in the treatment of surface lesions and it is perhaps fortunate for the sake of radium therapy that this type of new-growth proved to be radio-sensitive. The enthusiasm which resulted from the brilliant early work in epithelial growths led to the erroneous conclusion that if such results were possible with superficial cancer, radium provided the means of cure of all cancer. There was the inevitable reaction as the truth became known and from this stage we have not yet fully emerged. Nevertheless, it is difficult even yet, when one is familiar with the ease and certainty with which some epitheliomata may be cured with radium, not to believe that there must be some method by which such an agent may be applied in deeply-seated cancer in such a manner as to prove equally successful.

Epitheliomata

The treatment of the various pre-epitheliomatous lesions, keratoses, etc., has been discussed elsewhere[1] and the present paper is not concerned with this phase of the subject.

In the treatment of cancer of the skin the percentage of cures is already so high and the conditions of success are so well understood, that one has the conviction that almost no patient should die of this disease. Yet in the Province of Ontario one is astonished to find that there were 87 deaths from this disease during the

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* Read at the sixty-third annual meeting, Canadian Medical Association, Toronto, June 24, 1932.

Preceding articles in the second series on physiotherapeutical subjects can be found in the *Journal*, 1932, **27**: 521, 612; 1933, **28**: 30 and 182.

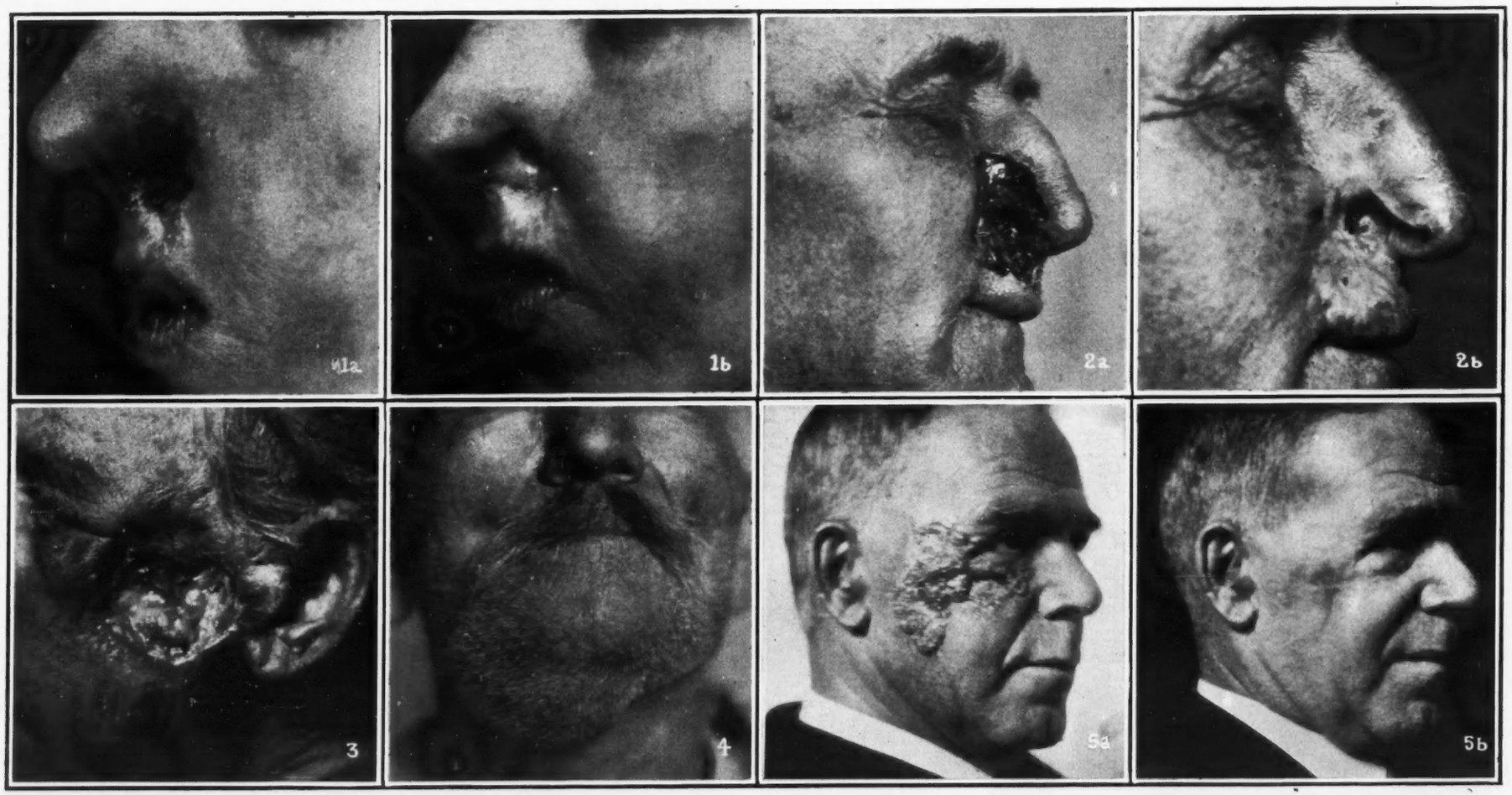

FIG. 1 (a)—This lesion had been repeatedly cauterized and had been treated by both x-rays and radium without success. The result is loss of tissue and cellular changes, making subsequent success more difficult.

(b)—Healing has been secured by radium, but loss of tissue leaves an undesirable cosmetic result.

FIG. 3—The lesion has extended through the entire thickness of the skin and now involves bone and subcutaneous structures. Such a lesion is not curable by radium though its progress may be retarded for long periods.

FIG. 4—A small primary lesion with very extensive secondaries, which resisted all forms of treatment.

FIG. 2 (a)—A lesion of long duration, with extension down to the cartilage and considerable loss of tissue. Had been treated by numerous methods including radium.

(b)—Finally healed by suitable radium therapy, but there is always more risk of recurrence in such cases.

FIG. 5—A lesion covering a large area of skin but without deep extension may prove to be quite amenable to treatment.

year 1930. This being the case it seems clear that we have it in our power as a profession to very materially reduce this mortality, since in this field at least there is no longer room for scepticism as to the value of radiotherapy.

The factors which determine success or failure in the treatment of any malignant lesion are varied and in epithelial lesions we find most of the fundamentals illustrated. One of the most important of these is not fully understood and is the subject of intensive study and research in every centre where radium therapy is being conducted. This is the biological response which the cells in any individual tumour make to the radiation from radium. It is known as *radio-sensitivity* and is the most variable factor to be dealt with. Some types of cells are highly radio-sensitive and respond readily to radium treatment. Others are extremely refractory, and are therefore described as radio-resistant. In other words, in this type of case the lethal point of the cells composing the malignant lesion is too nearly the lethal point of the normal surrounding tissues and a dose of radium sufficient to destroy the tumour must also destroy much healthy tissue as well. In the first group, the radio-sensitive tumours, the percentage of cures is high, and these are accompanied by excellent cosmetic results and a minimum of scarring. In the second group the percentage of cures is much lower and may sometimes be accomplished only at the expense of loss of tissue and more or less undesirable scarring.

It would obviously be of tremendous advantage if the degree to which a tumour would respond could be predicted beforehand, and much study has been given to this subject, unfortunately with only partial success up to the present. It was naturally hoped that a study of the histology of tumours would provide the key to this problem, but while much useful information has been derived from this source it has not as yet proved a reliable guide to the manner in which cells will respond to radiation therapy. For the present it is probably sufficient to say that there is some inherent quality in cells, which we call radio-sensitivity for lack of a better name, which determines to a considerable degree at least to what extent success in treating any lesion may be possible. Some workers think this is a specific effect and that within a few years radium therapy will be quite sharply limited to those types of lesions which are known to respond well and in which the effects are sufficiently constant as to be described as specific. In the meantime improvements in the technique of applying radium are gradually increasing this scope in fields heretofore considered unsatisfactory, and it seems quite possible that means may be found of actually increasing the degree of sensitivity in some types of tumours which are at present regarded as resistant.

These considerations are of most immediate concern to the laboratory and those interested in radium technique. There are, however, certain factors having a very practical bearing upon the success of treatment which should be known to the profession at large.

Early Diagnosis and Early Treatment

Apart from the urgent importance of early diagnosis there are few things of greater moment to the victim of malignant disease than is the first line of treatment adopted in dealing with his disease. It has been repeatedly pointed out that in this disease nature gives practically no help whatever, and the possibility or otherwise of ultimate cure is frequently settled by the first physician who sees the patient. Thus it is that *one of the conditions which very materially complicates the treatment of epitheliomata is previous unsuccessful treatment.* Frequently these lesions have been repeatedly cauterized either by chemical, thermal, or electrical methods, or they have been unsuccessfully treated by x-rays or radium. In any such case the possibility of completely and permanently healing the lesion is definitely diminished and may be completely lost (see Figs. 1 and 2).

The Extent of the Lesion

Similarly, extension of the lesion completely through the skin adds a complication which may prove to be an insuperable handicap. So long as an epithelioma is limited to the skin its cure may be expected in a very high percentage of cases, but once it has ulcerated through and involved the deeper structures this percentage becomes considerably reduced, and if the extension includes the involvement of bone or cartilage the outlook for actual cure becomes extremely slight. In many cases lesions which are very extensive, covering large areas of skin, prove to

PLATE II

FIG. 6 (a)—Epithelioma at the edge of the lid and very close to the lachrymal duct.
(b)—Lesion cured by radium treatment without scarring and without interference with function of lachrymal duct.

FIG. 8 (a)—Extensive lesion with ulceration extending over the edge of the lid and involving the region of the lachrymal duct.
(b)—Healing secured without deformity or interference with function.

FIG. 7 (a)—Small epithelioma of the rodent ulcer type close to edge of lid.
(b)—After treatment.

FIG. 9 (a)—Neglected lesion of the rodent ulcer type.
(b)—Result one month after a single radium treatment. Illustrates a very radio-sensitive type of lesion.

be a much less difficult problem than smaller lesions which have ulcerated deeply. While the involvement of regional lymphatics is not common in this type of lesion, nevertheless it is in the group accompanied by ulceration in which it most commonly occurs (Figs. 3, 4 and 5).

THE SITE OF THE LESION

The location of malignant lesions does not necessarily influence the degree to which they respond, although it frequently presents difficulties in the ease with which treatment may be carried out. There is a common belief that radium cannot be applied to lesions close to the eye, and yet there are no very considerable difficulties in connection with the technical application of radium right up to the edge of the lid. The chief difficulty which may be experienced here arises not from the proximity to the eye so much as from the danger of fixation of the ulcers to the underlying structures, followed by early involvement of the bony wall, either of the side of the nose or of the orbit, and gradual extension of the lesion from this point. In a few such cases even the sacrifice of the eye itself has not been sufficient to control the disease and the lesion has extended along the tissues or the orbit in spite of any measures which could be taken to prevent it. The risk of this occurrence is considered such a real one that every effort should be made to treat lesions in this location at the earliest possible date and obtain permanent healing while the lesion is still limited to the skin and has not become fixed to the deeper structures. There is the additional risk in lesions involving the inner canthus of the eye of adhesions causing slight ectropion and thus interfering with the function of the lachrymal duct on this side. This can usually, although not always, be prevented by very great care in the application of the radium and in a selection of radium in the most suitable form, so as to obtain the desired result without sloughing or loss of tissue. This end is to be attained by the use of radium in a form giving almost a pure gamma radiation, that is, by the use of high filtration (Figs. 6, 7 and 8).

Epithelioma of the dorsal surface of the hand has proved to be, in our experience, an unusually resistant type of lesion and frequently results unsatisfactorily. This may be partly due to the fact that the disease usually occurs in quite elderly patients whose occupation has been in the open where they have been exposed for years to sun and weather and whose tissues as a rule do not heal kindly under any circumstances. In such cases it is frequently found that the application of radium is followed by the disappearance of the lesion, leaving a chronic ulcer which makes no attempt to heal. Finally, after remaining in this condition for some weeks or months, the growth slowly recurs along the edge of the ulcer and further treatment only enlarges this ulcer. There is a strong probability of glandular involvement in the axilla, and in not a few cases amputation will become necessary, accompanied by dissection of the regional lymphatics. At the present time we do not feel satisfied with the radium treatment of these lesions, and believe that when they are small and can be safely excised this should be done, followed by post-operative irradiation either by radium or x-rays. An alternative method of treatment which is very promising is a massive dose of unfiltered x-rays which must amount to the equivalent of from three to five times an erythema dose to be effective and which will be followed by very intense reaction in the area so treated. In one or two cases it has been necessary to combine both of these methods of treatment, that is, both radium and unfiltered x-rays, giving maximum doses of each simultaneously and by this means lesions have been healed which had proved resistant to smaller doses.

LESIONS AT MUCO-CUTANEOUS JUNCTION POINTS

It has long been an axiom in medical teaching that malignant disease occurring at the junction of the skin and mucous membrane is more dangerous than a lesion arising on either skin or mucous membrane alone. We are not convinced that this is an accurate statement, nor indeed that any generalization can be made in which all lesions arising at muco-cutaneous borders may be compared, either as to their degree of malignancy or as to the results obtained by treatment. Our present impression is that the primary lesions in these locations differ decidedly in the manner in which they respond to radium. They are all alike, however, in that they are complicated by the danger of early involvement of regional

PLATE III

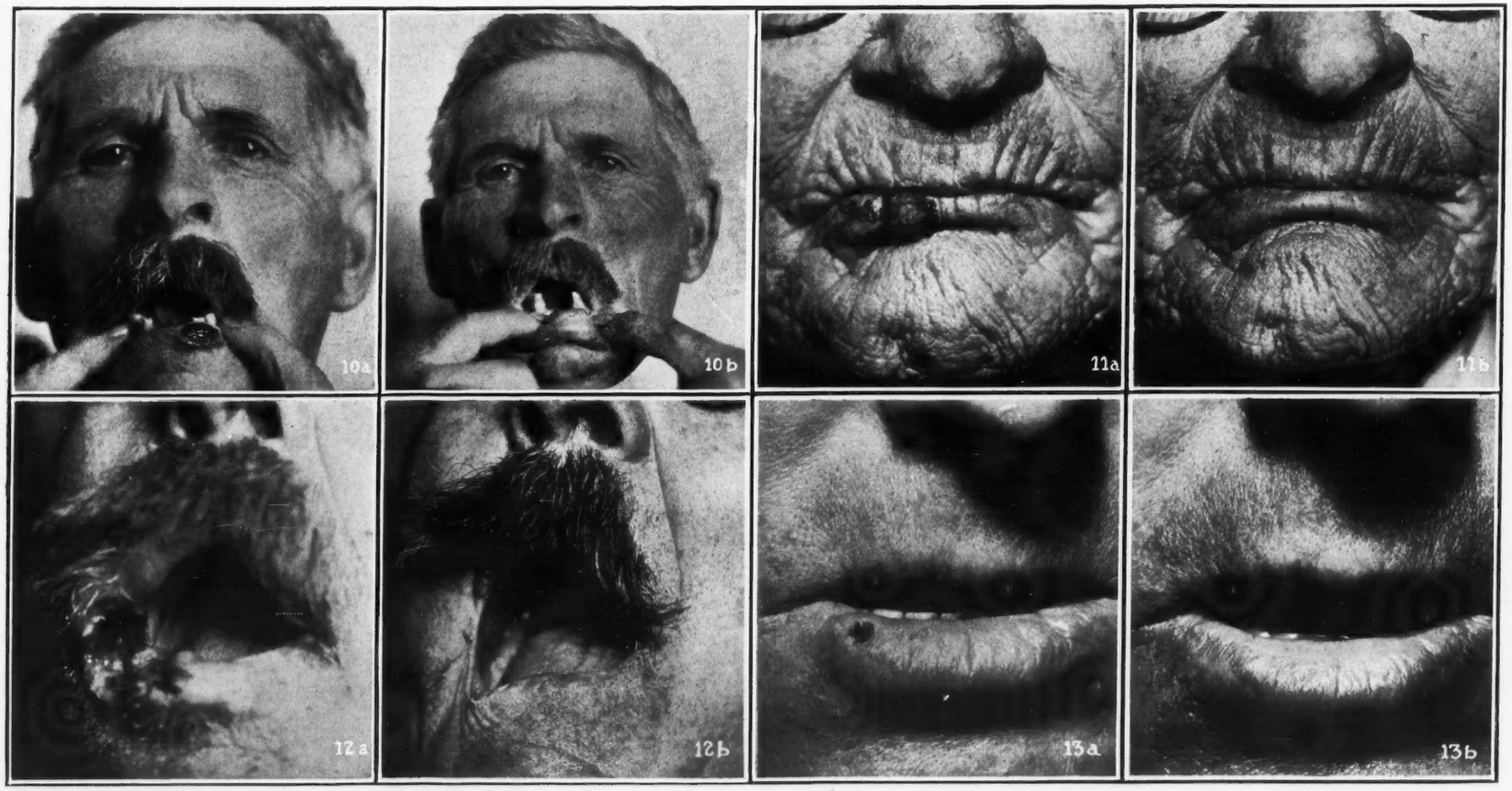

FIG. 10 (a)—Epithelioma of the lower lip at the muco-cutaneous juncture. No involvement of regional lymphatics.
(b)—Primary lesion healed by single radium treatment. Prophylactic irradiation of glandular areas.

FIG. 12 (a)—A lesion of short duration with great activity; deep ulceration in a period of six weeks.
(b)—Healed by single radium treatment. The patient remains well over three years.

FIG. 11 (a)—Epithelioma at muco-cutaneous juncture in a female patient—a relatively rare lesion.
(b)—Cured by a single radium treatment. No involvement of regional lymphatics.

FIG. 13—A small lesion on the lip which the patient considered a simple cold sore. The glands were already involved.

lymphatics, and this involvement is frequently the factor which determines the ultimate success or failure of treatment. This risk, however, is not greater than obtains in malignant involvement of mucous membrane, although it probably is much greater than in malignant involvement of skin. At the anal margin malignant lesions appear to respond well to adequate doses of radium, but these doses require to be large. In our own experience treatment by surface applications either of tubes, needles, or radium packs has been unsatisfactory, and the most successful results which have been obtained have been by the insertion of highly filtered radium needles.

Epitheliomatous lesions arising on the vulva or the external genitals in men present an extremely difficult problem, and the percentage of cures to be obtained by radium or x-ray treatment alone is probably small. This matter is too complicated and too difficult to do more than refer to it at the present time, as it deserves very careful and extended treatment as a separate subject.

Epithelioma of the lip constitutes one of the most common problems in the treatment of malignant disease, and so far as the primary lesion is concerned does not seem to present a very difficult problem. The vast majority of these lesions can be healed by radium, leaving an inconspicuous amount of scarring, and the real problem arises from involvement of regional lymph glands, a subject which is beyond the range of our present paper. Some of these lesions occurring on the lip are extremely radiosensitive and may be healed perfectly with a simple application of radium. Examples are shown illustrating lesions in the lower lip of a male patient (Fig. 10) and of a female (Fig. 11), the latter a somewhat unusual and interesting occurrence, as these lesions are very predominantly found in the male sex.

Experience in the treatment of epithelioma of the lip illustrates as well as almost any branch of radio-therapy the amazing variation in the life-history and degree of malignancy which occurs in connection with cancer and which introduces one of its most important problems. Some lesions, such as one found in one of our series, may be present for many years, developing extremely slowly, so that the surface becomes covered with a horn-like growth which, in our case, projected nearly half an inch and the inconvenience of which finally decided the patient to come for treatment. In this case, despite its long history, there was no indication of the glands being involved and the lesion was entirely healed by a single application of radium; or again the lesion may be extremely active and accompanied by deep ulceration as is illustrated in Fig. 12, presenting a situation which, although it has been present for only six weeks, is so extensive as to be considered almost entirely hopeless. Yet in this case no glands were palpable and the lesion was entirely healed by a single treatment by radium and has remained healed for over three years. In this case no glands have been involved, although as a matter of precaution the glandular areas have been very heavily irradiated as a prophylactic measure. Such a case as this, it may be pointed out, illustrates one of the triumphs of radium therapy, as prior to the days of radium it would have been entirely hopeless from the standpoint of surgical treatment, and was so considered by the surgical staff before being submitted for radium therapy.

As a contrast to this type one finds an extremely small lesion which seems little more than an ordinary cold sore to the patient, yet is ulcerating into the substance of the lip and is accompanied by palpable glands on the corresponding side of his neck.. As will be seen from the illustration (Fig. 13) the primary lesion has been healed perfectly and very simply by a suitable application of radium. The glandular problem is being dealt with as a separate matter. An illustration of the tragic consequences which may follow is shown in the next illustration in which the primary lesion was so small that it did not at any time attract the attention of the patient but had to be searched for, whereas the major lesion consists of a mass of glands in the submental and submaxillary areas which resisted all forms of treatment, including surgery and radium therapy in the most aggressive forms in which it could be used (Fig. 4).

CELL PATHOLOGY

As has been pointed out previously, the study of the histological characteristics of cells has led pathologists to grade them according to their malignancy and much study has been devoted to this branch in an attempt to simplify the

PLATE IV

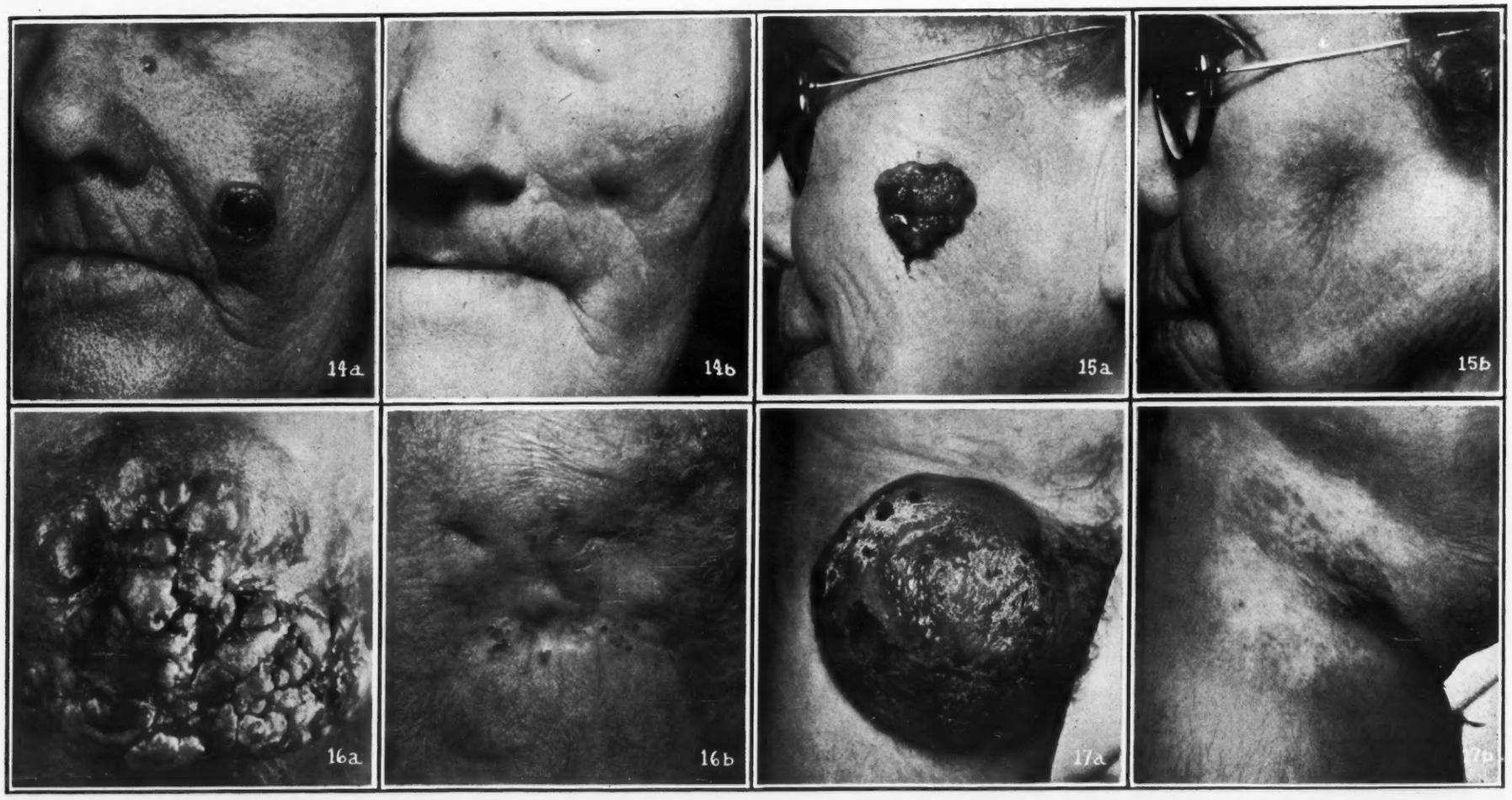

FIG. 14 (a)—A melanotic mole in the stage of activity.
(b)—It was destroyed by electro-coagulation followed by radium treatment.

FIG. 15—A melanotic mole treated by electro-coagulation followed by radium treatment.

FIG. 16 (a)—Epithelioma of scalp one month after receiving a treatment by high-voltage x-rays. During this time it was reduced in size nearly one-half.
(b)—The same case six months later. The lesion has entirely healed and is still healed, two years later.

FIG. 17 (a)—Neoplasm arising in right groin, no biopsy. Successfully treated by a combination of high-voltage x-rays and radium.
(b)—Condition six months later following treatment.

problem of dosage and to indicate in some degree in what type of tumours success might be anticipated and in what types success could not be hoped for. Much progress has been made along this line which is of more interest to the special worker, and for the purpose of our present paper we may discuss this aspect of the subject under two or three illustrative headings as follows.

Rodent ulcers.—The usual rodent ulcer is an excellent example of a radio-sensitive lesion which is cured in the vast majority of cases by one or two treatments. On the whole, the location of such lesions does not seem to materially influence the degree to which they respond, and cures should be obtained in a very high percentage of cases, certainly not less than 90. How rapidly this may sometimes occur is demonstrated by one of our cases in which the total time from the first application of radium until the lesion had entirely disappeared and the skin completely restored was six weeks. A very unusual manifestation of a rodent ulcer is shown in Fig. 9 which has been neglected in a manner quite inexcusable. At first glance a lesion of this kind would be considered so hopeless as to scarcely justify any attempt at treatment. However, these lesions are usually so radio-sensitive that surprising results may be obtained, as was the case in this patient shown by a picture taken less than one month following the previous photograph. The radium reaction is still visible in this case and much further improvement could undoubtedly have been obtained, but at this stage of the treatment the patient was transferred to the Home for Incurables against our wishes and we have been unable to follow the treatment owing to the opposition of her relatives that anything further should be undertaken.

Rodent ulcers elsewhere than on the face are sufficiently rare to be interesting and an example was recently encountered of a rodent ulcer on the leg, which had ulcerated down to the muscles and proved to be unresponsive to treatment. In this case an amputation was finally resorted to as being the best solution of the patient's difficulty, as even if the ulcer could have been healed he still would have a practically useless leg.

EPIDERMOID CARCINOMA

Other types of epithelial neoplasms have been found to be distinctly more resistant to irradiation than rodent ulcer, and have been described under a series of names, including squamous-cell epithelioma, prickle-cell epithelioma, etc., all of which are now commonly grouped together as epidermoid carcinomata. These lesions are somewhat variable in their response to irradiation and as a class require a much heavier dose than do rodent ulcers (Fig. 16). In many cases surface applications of radium or x-rays will fail, and because of this we believe it is unwise to persist in such methods of treatment beyond two or three trial applications. If, at the end of that time it is not obvious that a satisfactory result is being obtained only harm can result from persevering with that method of treatment; by so doing, changes are brought about in the tissues in the lesion and around it which make subsequent efforts much more difficult, and may result in transforming a curable lesion into one which may ultimately prove to be quite hopeless. Such lesions form a very large percentage of skin cancer coming for treatment to any radiotherapeutic clinic.

Pigmented and melanotic moles.—This lesion has been frequently referred to by the present writer in previous papers and is merely included here again for the purpose of emphasizing its importance in the field of external malignant lesions. We believe it is unsafe to take biopsies in this type of lesion and think it is preferable not to excise them, but rather to destroy them *in situ* by electro-coagulation followed by a comparatively heavy dose of radium or of unfiltered x-rays. By such means the lesion is perfectly healed and the danger of metastasis is at least reduced to a minimum (Figs. 14 and 15).

SURGICAL TREATMENT

The question of excision constantly comes up for consideration in connection with any or all of the lesions previously discussed, and there are some surgeons who still practise excision and then refer the patient for post-operative irradiation of some sort. The radiologist feels that in the majority of cases the excision is unnecessary, and in a considerable number will result in more scarring than would have otherwise been the case. This is especially true about

the face where it may be difficult or impossible to perform an excision sufficiently wide to be certain of curing the disease without very extensive scarring. If, under these circumstances an excision is practised it is usually too restricted and dependence must necessarily be placed upon irradiation to prevent recurrence. In such a case the responsibility for preventing the recurrence is placed entirely upon the radiologist, who could, by the same procedure by which he undertakes to prevent the recurrence, have cured the lesion in the first instance.

REFERENCE

1. RICHARDS, *Canad. Pub. Health J.*, 1931, **22**: 325, 387.

TUMOURS OF THE EXTRA-HEPATIC BILE DUCTS, EXCLUSIVE OF THE AMPULLA OF VATER*

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Montreal

WITHIN eight weeks two cases of primary extra-hepatic bile-duct carcinoma came to autopsy in the Montreal General Hospital. The opportunity stimulated a detailed study of these tumours.

Benign tumours of the extra-hepatic bile ducts are uncommon. Cystic and solid adenomas, commonly found in the intra-hepatic ducts in stasis and cirrhosis, are rarely seen in the extra-hepatic ducts. Submucosal lipomas have been reported by Devic and Gallavardin, and Bazin[1] refers to three cases. Fibromas have been reported, but many of the older records lack microscopical confirmation and are open to question. Intermittent obstruction of the common duct from a neuroma in the cystic duct, following cholecystectomy, has recently been reported from the Mayo Clinic by Comfort. Only 4 cases of common or cystic duct obstruction from benign tumours have been observed in that clinic.

Simple papillomas may occur anywhere throughout the extra-hepatic biliary passages. These tumours are usually small, yet may be large enough to produce complete obstruction. Masson[2] states that microscopically these papillomas are in general similar to the papillo-adenomas of the stomach, but differ in that they may invade the muscle of the duct and still be benign. Dr. A. T. Bazin, of the Montreal General Hospital, recently removed a benign papilloma from the common duct of a man aged 70. He has had no return of symptoms since operation, 18 months ago. Bazin found reports of only nine papillomas of the common duct and one papilloma of the cystic duct. Grieg has reported the successful removal of a common-duct papilloma in a middle-aged woman.

Myxomatous degeneration may occur in papillomas and probably explains instances where the common duct is tremendously dilated by myxomatous material. Mayo-Robson states, "That the growth may in the first instance be a papilloma and subsequently assume malignant characteristics is suggested by the fact that the tumour projects into the lumen of the canal as a villous-like mass, while at the same time the submucosa is infiltrated to a greater or lesser extent." Somner states that there is no relationship between the size of a papilloma, the degree of its malignancy, or the extent of its metastasis.

The association of common-duct stones with common-duct papilloma has been observed by numerous authors. In 1894 Sir W. H. Bennett successfully removed a papilloma from the common duct of a woman, 54 years old, in St. George's Hospital, London. The growth was near a gall stone which had been impacted in the common duct for two months.

The signs and symptoms resultant from benign tumours are not characteristic, and they are usually diagnosed at operation or autopsy. The slender pedicle, common in papillomas, makes their removal comparatively simple. Bazin had no difficulty in removing the pedunculated tumour in his case. Archibald refers to the difficulty in identifying small duct papillomas by palpation, and stresses exploration of the common duct throughout its length in all questionable cases.

* From the Department of Pathology, the Montreal General Hospital, Montreal.

Malignant tuomurs of the extra-hepatic biliary passages are usually carcinomas. I have found no reference to a proven case of sarcoma, exclusive of the ampulla of Vater. Durand-Fardel in 1840 was the first to report a case of primary carcinoma of the common duct, and Schueppel in 1878 reported the first primary carcinoma of the hepatic duct. Since then the reported cases have been reviewed by various authors. Rolleston and McNee[3] collected 92 authentic cases. Various surgical and autopsy records indicate that primary bile-duct carcinoma and primary gall-bladder carcinoma occur in a ratio of approximately 1:4. In 9,523 consecutive post-mortem examinations done at the Montreal General Hospital there were 782 cases of carcinoma. Seven were primary in the extrahepatic ducts, exclusive of the ampulla, and 24 were primary in the gall bladder. In this series extra-hepatic bile-duct carcinoma constituted 0.895 per cent of all carcinomas, while gall-bladder carcinoma made up 3.06 per cent, a ratio of 1 : 3.04.

There is a possibility of error in ascertaining in advanced cases the exact site of origin, as when a carcinoma arises in the neck of the gall bladder and extends to widely involve the cystic and common ducts. Small slowly growing tumours of the ducts may be entirely overlooked, or, on account of the great overgrowth of fibrous tissue, may be mistaken for benign stricture. Graham *et al.*[4] report a post-mortem finding which was considered to show a benign stricture, but, after many sections, it was found to be a carcinoma.

Extra-hepatic bile-duct carcinoma is more common in men than in women. Various observers have found the ratio to be approximately 3:2. Three of our 4 cases were males. In contrast, carcinoma of the gall bladder is five times more common in females than in males.

In both sexes carcinoma of the bile ducts usually occurs between the fifth and the eighth decade. Miodowski in an analysis of 39 cases found 3 cases between 30-40, 8 between 40-50, 9 between 50-60, 14 between 60-70 and 5 over 70. The oldest was 81, the youngest 29 years of age.

The etiology of bile-duct carcinoma is quite as obscure as that of malignant disease in general. Numerous contributing factors are mentioned. Small ulcers, probably secondary to gall-stone irritation, are blamed, while Zenker and others believe that papillomas may become malignant. McGlinn,[5] one of the many who have discussed this relationship, states, "While much may be said regarding the frequency of gall stones without carcinoma, it remains that irritation is a known cause of carcinoma, and stones and the accompanying inflammation can serve as an important factor in the production and development of malignant disease. Significant proof is that secondary carcinoma of the gall bladder and ducts is very rarely associated with stones."

The most common site of primary bile-duct carcinoma is at the junction of the three ducts. This site is stated by Graham as also being the most common site of benign stricture. Figures of various authors concerning the primary site are as follows:—

Author	*No. of cases*	*Common duct*	*Hepatic duct*	*Confluent type (junction of 3)*	*Cystic duct*
Donati...	117	48	32	37	..
Rolleston	92	23 (upper end) 11 (lower end)	19 (common) 4 (rt. or lt.)	28	6
Shuller...	60	——19——	(remaining cases at ampulla)		
Renshaw.	20	14	..	6	..
McGlinn.	5	2	1	..	2
Miller....	4	1	1	1	1
M.G.H...	7	3	1 (common) 1 (left)	1	1
	305	102	59	73	10

Undoubtedly individual cases have been considered more than once in the various reports, and we do not feel justified in formulating exact percentages. The most common sites of origin are evident however. Carcinoma arising at the junction of the hepatic ducts is rather uncommon and primary cystic-duct carcinoma is rare.

On gross examination, bile-duct carcinomas are usually small, firm or hard, and white. On palpation they may simulate an impacted stone. Bulky tumours of the type often seen in the intestinal tract are extremely uncommon in the biliary tract.

Ewing[6] describes three characteristic types of carcinoma in the bile ducts. (1) A villous type, characterized by single or possibly multiple small growths, which may early fill the lumen of the duct; (2) a nodular or annular type, in which the tumour grows in the submucous and

muscular layers of the duct, early encircling it and resulting in obstruction; and (3) a diffuse type, in which the tumour extends along the duct wall, converting it into a rigid pipe-stem-like structure, with occasional ulceration, or projecting into the lumen. This tendency of the newgrowth to extend along the duct walls, often involving a considerable portion of the extra-hepatic tree, sometimes makes localization of the exact site of origin difficult. In this type of case, although clinically there may be complete biliary obstruction, at autopsy the obstruction may not be anatomically complete. This was true in one of our recent cases. Similar cases have been reported by Poynton and by Cabot. Rolleston considers that this phenomenon is probably due to muscular spasm during life, and it is also probable that swelling incidental to any infection may play a part. Ewing states that only very moderate compression of the duct is sufficient to cause biliary stasis and jaundice.

Extra-hepatic bile-duct carcinoma in general grows slowly, but metastases are often found early in the illness. The regional nodes become involved, and, commonly, in the terminal stages the tumour passes to the liver *via* the lymphatics, or by direct extension. Devic and Gallavardin found metastases in only 20 per cent of their cases. In Musser's 8 cases, the liver was involved seven times, the mesenteric nodes once, the peritoneum once, and the pancreas once. In our 4 cases the liver was involved in every case, the regional nodes twice, and the lungs twice. Cabot reports a common-duct carcinoma in which metastases replaced three-fourths of the liver substance, and a metastatic mass on the back of the uterus, compressing the sigmoid colon, misled the clinicians into making a diagnosis of carcinoma of the colon with hepatic metastases. In the extremely malignant case reported by Poynton, there were metastases in the brain, clavicle, rectus abdominis, cervical, thoracic and mesenteric lymph nodes, adrenals and peritoneum.

Based on their microscopic structure, Ewing[6] divides the extra-hepatic bile-duct carcinomas into three types: (1) papilliferous; (2) gelatinous; and (3) infiltrating. They are all usually adenocarcinomas and are composed of either columnar or spheroidal cells. He considers that the types in general are quite similar to those arising in the gall bladder, the chief difference being their tendency to fibrous-tissue overgrowth, which results in a choking of the epithelial elements, often making exact histological diagnosis difficult. Tumours of the columnar-celled type are the most common and arise from the epithelial lining of the ducts. Rolleston believes that the spheroidal cell type probably arises from the mucous glands in the duct wall, or may, as a result of an increased rate of growth, develop from a transition of the columnar-cell type. It is this variety that is often called the atypical form of carcinoma. Mucoid degeneration is common, leading to distention of the acini and giving the picture of a typical mucoid carcinoma.

In all primary duct carcinomas the tendency toward the scirrhous type is very striking. Metaplasia with resultant formation of squamous-cell carcinoma of the bile ducts is considered a possibility.

In 1890 Courvoisier stated the now famous axiom, "With obstruction of the choledochus by stone, distension of the gall bladder is rare; the organ is usually shrunken. With obstruction of other kinds, on the contrary, distention is the rule; shrinking occurs in only one-twelfth of the cases." When an obstructive growth involves the hepatic duct above the junction with the cystic duct, the gall bladder is usually collapsed or empty. If the obstruction is at the junction of the common, cystic and hepatic ducts, the gall bladder may be contracted, or distended with bile. If the obstruction is complete, the gall bladder will contain no bile, but may be hydropic. Vincent states that the gall bladder is enlarged in 86 per cent of the cases of carcinoma of the common duct below the cystic duct. In 14 cases of carcinoma at the junction of the three ducts, reported by Devic and Gallavardin, the gall bladder was dilated in 7, normal in 3 and contracted in 4. These authors collected 10 cases of hepatic duct carcinoma, observed at autopsy, in which the gall bladder was contracted in 4, normal in 1, dilated in 2 and not mentioned in 3.

The ducts below the tumour generally show no lesion. Above they are usually dilated to many times their normal size, often being one or two centimetres in diameter. Early in the obstruction, the ducts above the tumour are

filled with bile; later they may contain a clear mucoid material.

The size of the liver in primary bile-duct carcinoma varies considerably in different cases. In the early stages the organ is usually enlarged, while later it may not be palpable. Cabot reports one case in which intense jaundice and a greatly decreased liver dullness suggested acute yellow atrophy. The external surface of the liver is usually dark green and section shows a mottled green surface, due to distended bile radicles. Microscopically, there is a great deal of bile stasis and there is occasionally a definite central necrosis. Flutterer considers that the necrosis is due to a reversal of the flow of bile into the perivascular lymphatics around the central vein, leading to necrosis of the neighbouring liver cells. The correctness of this explanation is open to question, as the presence of lymphatics within the liver lobule proper has never been definitely proved. Frequently round-cell infiltration is seen about the necrosed areas.

Rolleston believes that real cirrhosis is an uncommon accompaniment of carcinoma of the ducts, although he admits that it may have existed about the ducts prior to the development of malignant disease, or that periductal fibrosis may have resulted from cholangitis due to gall stones or subsequent infection. Small dilated intra-hepatic ducts may appear as prominences upon the surface of the liver and should not be mistaken for metastases.

SYMPTOMS AND SIGNS

In many instances there is no history of symptoms referable to the biliary system until icterus makes its insidious appearance. A history of vague upper abdominal distress preceding the onset of jaundice is, however, occasionally elicited. In Renshaw's 20 cases, 11 gave a history of gall-stone or gall-bladder disease for an average of 5 years, and one for 9 years preceding the onset of the obstructive symptoms. Nine patients gave no history of illness before the onset of jaundice. Mayo-Robson states that it is usual to have a long history of biliary colic. In our most recent cases, only one gave a history of indigestion preceding the onset of obstructive signs. Illness in most cases begins with the gradual appearance of *jaundice*, which slowly increases and, usually without intermissions, grows progressively deeper. As a rule there is no pain and the complaints of the patient are those attributable to the icterus, pruritus, hæmorrhagic tendency, loss of appetite, insomnia, mental confusion with depression, and malaise. While other symptoms develop later, those just enumerated persist and become more accentuated as the illness progresses.

If the tumour is in the cystic duct, jaundice appears only when the common duct becomes involved, or when catarrhal inflammation of it develops. While a gradual onset is the rule, icterus may appear as suddenly as in common-duct stone. Deaver makes the statement that "Carcinoma of the ducts causes a jaundice that is permanent and never intermittent." While icterus is in practically all cases permanent, it may be definitely intermittent. In one of our cases, a definite decrease in jaundice, four months after its appearance led the clinicians to doubt the diagnosis of bile-duct carcinoma already made. Poynton and Cabot have each reported a case of proved carcinoma of the common duct in which there was no jaundice. These were both of the "pipe-stem" type, without complete duct obstruction. One of our own cases died, with only a slight icteroid tinge to the sclera.

Pruritus, which causes most of the discomfort, is the rule and generally appears with the jaundice. It may precede it by some days, as in one of our cases, or may not appear until icterus is well established. We are unable to suggest any satisfactory explanation for its occasional absence. Accompanying the jaundice and the pruritus is the tendency to bleed, and the patient often shows many bleeding scratch marks. While *pain* is usually not a feature, it may be present in degrees varying from a dull ache in the right upper quadrant to severe paroxysms, even in the absence of stones. The pain in the latter instance is probably due to the efforts of an over-distended gall bladder to empty itself. If stones are present, the pain may be of the classical "colic" type.

Constipation is the rule, although it may alternate with diarrhœa. Not infrequently *diarrhœa* initiates the illness. After the onset of jaundice, the stools are generally clay-coloured, though bile pigment can usually be demonstrated by chemical means. Three of our four recent cases had acholic stools.

Gross or occult blood may be present in the stools and rarely death may result from intestinal hæmorrhage. We found no reference to hæmorrhage from a newgrowth in the bile ducts before the onset of jaundice, though we have recently seen massive hæmorrhage from a small papilliferous carcinoma of the gall-bladder fundus in a patient with jaundice. In this case bile-duct colic resulted from blood clot in the common duct. *Chills* and *fever* are seldom seen with extra-hepatic bile-duct carcinoma, unless a suppurative cholangitis is present. The patient's appetite is often very poor and there may be a distinct distaste for fatty foods. Nausea and vomiting are not common during the course of the illness after the onset of the jaundice. While *loss of strength* is a common complaint, loss of weight is not of the degree usually associated with malignant disease. The mechanical effect resultant from the tumour's strategic location causes symptoms of obstructive jaundice before the tumour alone is large enough to cause cachexia. In our series the average weight loss was 7 kg. per patient.

Abdominal distension may make satisfactory examination difficult. The *liver* is *palpable* in about 50 per cent of the cases. It is seldom if ever possible to feel metastatic nodules in the liver during life. *Ascites* of moderate degree often develops, and was present in each of our four cases. The *gall bladder* is *palpable* as a smooth tumour mass in about 50 per cent of the cases, depending upon the location of the newgrowth. There may be a tenderness in the right upper quadrant or in the epigastrium, but it is not as definite as in inflammatory lesions in this region, and "muscle guard" is usually absent. The urine is usually deeply bile stained, often scanty in amount, and may contain albumin and casts. Three of our 4 cases showed bile, albumin and casts in the urine. *Glycosuria*, which has been noted in some cases during the terminal period, was present in 2 of our cases.

Marked *anæmia* is uncommon, but there may be a definite *leucocytosis* unassociated with fever or infection. The white blood cell count may reach 30,000, as in one of Cabot's cases. He states that he has frequently seen this in rapidly growing tumours in the liver. Coagulation time is characteristically prolonged while the bleeding time remains normal.

Terminal suppurative cholangitis may supervene, accompanied by fever, chills, very rapid loss of weight and strength, and death. Perforation of the gall bladder, followed by rapidly fatal peritonitis, has been reported by Sherrill and Rolleston. Hæmorrhage may occur as a complication, especially if any surgical procedure has been undertaken. In one of our cases, there was a massive terminal hæmorrhage following cholecystogastrostomy. Multiple liver abscesses, malignant endocarditis and thrombosis of the portal vein have been observed as terminal complications. Death usually results from biliary toxæmia. After the jaundice has become extreme the patient usually dies within six months, but may live much longer. The average length of life of our four recent cases was 5.2 months after definite onset of jaundice.

DIAGNOSIS

There are several conditions which may produce a clinical picture almost identical with carcinoma of the extrahepatic ducts. A stone in the common duct is one of these. Rolleston summarizes the points in favour of common stone duct as follows, "A history of colic immediately before the onset of jaundice, intermittent hepatic fever, chronicity of the illness, inability to palpate the gall bladder, and the fact that though the illness lasts for a long time, the jaundice is not especially deep or progressive. In long-standing jaundice from calculus, death usually results from cholangitis and infection, rather than from biliary toxæmia, as in carcinoma."

Primary carcinoma of the gall bladder in its early stages offers no difficulty in differentiation, for in this stage there is usually no obstruction of the ducts and hence no jaundice. Icterus eventually occurs in well over 50 per cent of gall-bladder carcinoma, and in this stage there may be no way to differentiate these cases clinically from primary bile-duct carcinoma. Carcinoma of the stomach, with hepatic metastasis, may be generally and readily eliminated by the history of indigestion, nausea, vomiting, hæmatemesis and melæna. A barium series usually settles the question. Primary liver carcinoma is a comparatively rare lesion, and is commonly characterized by the newgrowth arising simultaneously in a number of sites throughout its structure. The liver is usually greatly enlarged, and often irregular tumour nodules are pal-

pable, as noted in two cases which recently came to autopsy in the Montreal General Hospital. This is practically never seen in bile-duct carcinoma. Excluding carcinomas at the ampulla of Vater, extra-hepatic bile-duct carcinoma usually does not involve the pancreatic ducts, and hence does not exclude the pancreatic juices from the intestine. Examination of the duodenal contents proves the presence of the pancreatic enzymes. The fact that carcinoma of the head of the pancreas is more common than carcinoma of the extra-hepatic bile-ducts, may materially influence the clinical diagnosis when the lesion concerned is located below the cystic duct.

The syndrome of "catarrhal icterus" is usually readily recognized. It tends to run its course in two or three weeks, while jaundice due to obstruction by malignant tumours continues to increase. Subacute yellow atrophy may present a problem for differentiation from tumour of the ducts. The age, sex, signs of acute hepatitis, decreased liver dullness, and biochemical findings assist in ruling out this condition.

Moynihan has fittingly stated "No one living is infallible in the diagnosis of obstructive jaundice." The diagnosis is always difficult and the chance of a life saved is so important that, however positive the evidence of malignancy, I have advised operation in all cases."

No definite aid can be obtained from the laboratory. Cholecystography is of value in only a few cases and its usefulness depends upon the site of the lesion. If the diagnosis of carcinoma of the extra-hepatic ducts is entertained when any patient above thirty is seen with weight loss and a persistent or progressive jaundice, fewer cases will be missed and a higher percentage will be given the advantage of a possible surgical cure during the early months of illness.

SURGICAL TREATMENT

In the hands of experienced surgeons, the operative mortality for cholelithiasis, even in long-standing biliary disease, is about 3 per cent. Graham[7] believes that this may be reduced to approximately 1 per cent in uncomplicated cases. Weighing the danger of development of gall-bladder or bile-duct carcinoma in cases of cholelithiasis against possible operative mortality in experienced hands, the former definitely outweighs the latter. For these reasons it would seem that gall stones, with or without symptoms, are a menace and should be removed if the general condition of the patient warrants such a procedure.

The tendency of all extra-hepatic bile-duct tumours to grow slowly and remain small would indicate that, in certain cases, surgery may offer extremely gratifying results. In other cases the results may be only palliative, but in these, by relieving the jaundice and eliminating the pruritus, the patient is allowed to spend the remaining days in comparative comfort. Palliative operative procedures include simple drainage of the common duct above the obstruction, or anastomosis of the gall bladder or the dilated duct above the obstruction with the stomach or duodenum.

Pallin analyzed 52 cases in 4 of which a radical operation was attempted. An anastomosis of one kind or another was done in 9 cases, and in 7 the ducts were simply drained. Of 31 cases operated upon, 25 succumbed immediately, half of them as a result of post-operative cholæmic hæmorrhage and two from anuria. Pallin insists that the danger from cholæmia is seldom great until the jaundice has lasted three and one-half weeks, and recommends early operation in all suspected cases of malignancy. Fulde, who collected 20 cases in which a resection was done, states that the immediate operative mortality is about 65 per cent and the average duration of life following surgical procedures is about 15 months in those cases in which there were no metastases. He reported 18 cases in which radical operation was followed by 12 deaths. Upcutt considers that hæmorrhage is the chief post-operative cause of death, though he believes that hepatic insufficiency, cholæmia and shock all contribute. In the Mayo Clinic's series of 18 cases operated on, 3 were only explored; in 11 a palliative, and in 4 a radical operation was carried out. The operative mortality was 33.3 per cent. The average post-operative length of life of the 13 cases was a little over 5 months; one case lived 15 months and another a little over 3 years. Three of our four cases were operated upon. In one case a cholecystogastrostomy was done, in one a cholecystostomy, and one case was simply explored. None of these lived longer than six weeks following operation.

Between the years 1883 and 1931, 9,523 autopsies were performed at the Montreal General Hospital. Seven cases of primary extra-hepatic bile-duct carcinoma were observed. Four of these occurred during the past four years, and are summarized below.

CASE 1

J. L. B., male, aged 64, was admitted to the service of Dr. A. H. Gordon, on July 14, 1927, complaining of general weakness, pain in the abdomen and vomiting. His mother died of "stomach trouble," and one brother from carcinoma of the colon. For the past five years he had had indigestion, characterized by pain in the abdomen with indefinite food relief, unassociated with vomiting. Six weeks before admission, the pain became more severe, keeping him awake at night. It was dull and grating, began to the right of the umbilicus, passed to the gall-bladder region, and was entirely unrelated to food. His appetite was poor. He had lost four pounds in weight. There was some oliguria, with an increase in the colour of the urine, but the stools were normal in colour.

Physical examination.—The patient was pale, and showed recent loss of weight, but no icterus. There was a visible fullness in the epigastrium, especially on the right. The liver edge was palpable, somewhat rough and tender. Gall bladder not palpable. No ascites, but there was moderate œdema of the legs. The urine was negative. Red cells 4,000,000, white 6,000; hæmoglobin 78 per cent. Gastric analysis—total acidity 65; free HCl 39. No gastric retention; no blood. Barium series negative. Tentative diagnosis: Secondary carcinoma of the liver from some undetermined site. Exploration was advised but refused, and the patient was discharged. He was re-admitted on September 8, 1927. The pain had become more constant and severe, radiating to the right costal margin and to the right shoulder, and required morphine for relief. There was a slight, but definite, icteroid tint to the skin and sclera. The liver was palpable 8 cm. below the right costal margin, and there was fluid in the flanks. The stools were acholic. Iodeikon test: dye fairly well concentrated in gall bladder, which subsequently emptied itself normally. Exploration by Dr. W. L. Barlow, September 13, 1927, three and one-half months after the definite onset of symptoms. The liver was found to be studded with carcinomatous nodules. There was one litre of straw-coloured fluid in the peritoneal cavity. A thorough search of all the abdominal structures failed to demonstrate a primary site for the carcinoma, and a tentative diagnosis of primary liver carcinoma was made. The patient falied rapidly, ascites and marked dependent œdema developed, and he died on October 26, 1927, five months after the onset of symptoms and forty-three days after operation.

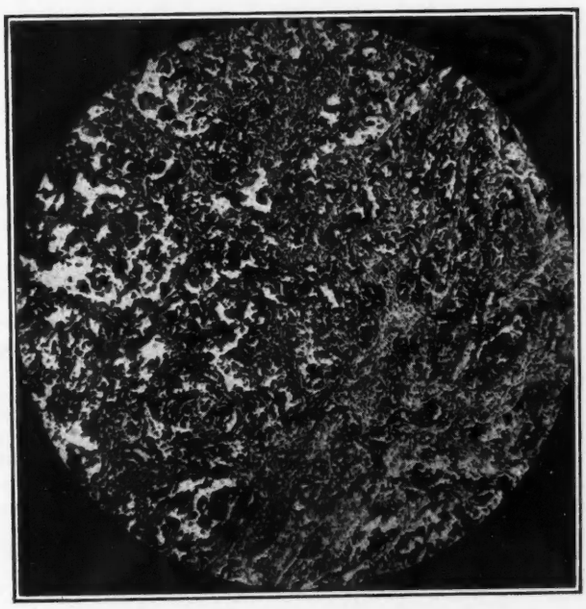

FIG. 1.—*Case 1.* (A-27-279) Cross section of the cystic duct to show extensive infiltration of the wall with tumour and partial occlusion of the lumen.

Abstract of autopsy.—A well developed, poorly nourished male; marked ascites and œdema of the lower extremities. The abdomen contained four litres of clear fluid; no peritonitis. The liver was large and studded with umbilicated tumour nodules. There was a small, firm nodule in the cystic duct, just above its entrance into the common duct. This nodule was yellowish white in colour and partially, though not completely, occluded the duct lumen (Fig. 1). There were no stones in the ducts or gall bladder. The lymph nodes about liver hilus were infiltrated with tumour. Sections through the nodule in the cystic duct showed typical adenocarcinoma of the duct type, which infiltrated the wall of the duct. The common duct remained quite patent and this explained the absence of severe jaundice. The metastatic tumour in the liver showed the same microscopical picture as did the primary tumour. In one lung section there was a collection of tumour cells. *Pathological diagnosis.*—Primary carcinoma of the cystic duct, just above the junction with the common duct; metastatic carcinoma in the liver, liver hilus nodes, and lung; broncho-pneumonia; general arteriosclerosis.

CASE 2

H. M., male, aged 65, was admitted to the service of Dr. A. H. Gordon on March 5, 1928, complaining of pain in the abdomen and chest, loss of weight, weakness and jaundice. He denied all previous gastro-intestinal or biliary symptoms. Six weeks prior to admission jaundice was noted, which, in a day or two, became marked. At the same time pain developed in the chest, the epigastrium and right hypochondrium. Pain was described as a dull constant ache, never throbbing or intermittent, and without radiation. Loss of weight and strength had been rapid.

Physical examination.—The stools were clay-coloured. He was mentally unstable and disorientated. There was deep jaundice of the skin and sclera. The lungs and heart were essentially negative. The abdomen was distended, and there was considerable resistance in its upper half. Marked tenderness in the epigastrium, especially over the gall bladder area, where there was definite muscle guard. Liver edge not palpated, but there was dullness to percussion three fingerbreadths below the right costal margin. No ascites, but there was slight œdema of the ankles. The urine showed much albumin, considerable bile, and an occasional granular cast. Red cells 3,900,000; white 5,000; hæmoglobin 60 per cent. Blood chemistry: urea nitrogen 24; creatinine 2.14; sugar 0.114; van den Bergh test positive (indirect). Urobilinogen in urine, present in less than 1:10 dilution. The iodeikon test did not visualize the gall bladder. The stools were clay-coloured; no gross or occult blood. Wassermann test negative. A barium series was interpreted as indicative of malignant disease of the stomach, though there was no six-hour retention. The temperature was never above 100° F., pulse 70 to 80. Diagnosis: Carcinoma of the stomach, with liver metastasis the dominant feature. This seemed to be confirmed by the barium series, though no occult blood was ever

found in the stools. Ascites developed, the patient failed rapidly, and died on March 16, 1928, two months after the onset of icterus.

Abstract of autopsy.—A well developed, poorly nourished male, with extreme jaundice. Two litres of clear fluid in the abdomen; no peritonitis. The liver was normal in size and shape, greenish yellow, rough and nodular on the surface. The nodules varied in size, were yellowish white in colour, with soft centres, though there was no definite umbilication. The gall bladder was small, thick walled, and contained no stones. Pressure on the gall bladder would expel no bile through the patent ampulla of Vater. The mucosa of the gall bladder was markedly congested, and in one place near the fundus the mucous membrane was raised above the surrounding surface as a yellowish white area. The mucosa over this area was quite intact, but firmly adherent to an underlying dense tumour tissue which was continuous with liver tissue. The cystic and common ducts were patent, but the hepatic duct was extensively involved by newgrowth, which had greatly thickened and distorted its walls and extended along the radicals of the duct into the liver. The lumen of the common hepatic duct was greatly encroached upon, but a fine probe could be passed through it. There were no stones in the ducts. Microscopically, the hepatic duct showed extensive carcinomatous involvement of the entire thickness of its wall (Fig. 2). The tumour was an adeno-

FIG. 2.—*Case 2.* (A-28-90) Cross section of hepatic duct to show extension through the wall into the periductal tissues at "A".

carcinoma and appeared in places to be rather undifferentiated and rapidly growing, with numerous mitotic figures. The tumour cells were pale staining with hyperchromatic nuclei, and were arranged after the fashion of embryonic glands. The liver was extensively infiltrated with tumour and showed marked fibrosis and increased vascularity. The gall bladder was acutely inflamed and showed an extension of carcinoma from the liver, which involved all the coats except the mucosa. The lungs showed œdema and congestion, and in several of the vessels tumour emboli were seen, the cells of which were similar to those in the hepatic duct. *Pathological diagnosis.*—Primary carcinoma of the common hepatic duct; metastatic carcinoma in the lungs and liver, with extension to the gall bladder; œdema and congestion of the lungs; acute splenic tumour.

CASE 3

Mrs. W. H., aged 62, was admitted to the service of Dr. C. A. Peters, on August 11, 1930, complaining of jaundice, loss of appetite, loss of weight and sleeplessness. There were no previous gastro-intestinal symptoms. The patient had used considerable alcohol before the war, but none since. Six weeks prior to admission she noted on arising that her arms, legs and face were covered with an extensive rash, which was elevated, extremely itchy, and bled on scratching. She was feverish, had lost her appetite, and vomited on several occasions, although she did not take to bed. The rash subsequently faded. One month before admission she became jaundiced and this had increased until admission. With the onset of jaundice, the stools became light coloured and the urine very dark. There was no pain, but an indefinite ache in the left lumbar region had been a marked feature. Night sweats and intense pruritus deprived her of proper rest during the past month. She lost 18 pounds in the six weeks before admission.

Examination on admission.—The patient was fairly well nourished, although the skin was wrinkled, dry and loose. There was intense jaundice of the entire body. There were no palpable glands. The abdomen was thick-walled and full, with slight resistance in the upper portion, unassociated with tenderness or definite muscle guard; no masses. Rectal examination negative. The urine was bile-stained, showed a trace of albumin and sugar and an occasional granular cast. Red cells 3,450,000; white 7,400; hæmoglobin 70 per cent; platelets 405,000; reticulocytes 2 per cent. Bleeding time 1.5 minutes (Dukes). Coagulation time 20 minutes (10 normal). Fragility normal. The stools were light brown in colour, free from blood and pus but bile was present. Fat analysis of the stools for pancreatic function showed total fat 7.87, neutral fat 1.74, fatty acids 6.13. Gastric analysis—no free HCl; total acidity 20; negative for gross or occult blood. Blood chemistry—normal findings. The van den Bergh test was positive (direct). Urobilinogen was present in the urine in 1 in 10 dilution. The Wassermann test was negative. Barium series negative. Iodeikon test—no gall bladder shadow.

During the next two months the patient lost weight and strength; the jaundice became progressively deeper, and the liver enlarged and painful. A distended gall bladder was never made out. A diagnosis was made of malignancy, either in the head of the pancreas or at the ampulla of Vater, although the absence of a palpable gall bladder suggested that the tumour might be above the cystic duct. The condition of the patient at that time did not warrant exploration. During November, 1930, the weight became stationary. This was followed by a gain of several pounds; the jaundice decreased a little, and the patient showed definite subjective and objective improvement. The possibility of a common duct stone with atypical history was reconsidered and exploration was advised. On December 2, 1930, five months after the onset of symptoms and eighteen weeks after the onset of jaundice, the patient was explored under spinal anæsthesia by Dr. E. M. Eberts. The gall bladder was hydropic and contained 50 c.c. of clear white fluid. The common duct was felt as a hard, irregular mass that did not seem directly connected with the head of the pancreas. A tumour nodule, 1 cm. in diameter, was seen in the anterior edge of the right lobe of the liver. The patient did not respond satisfactorily, the pulse became thready and she expired on December 7, 1930, the fifth post-operative day.

Abstract of autopsy.—A well developed, poorly nourished woman with extreme icterus. There was one litre of odourless yellowish brown fluid in the abdomen. The peritoneal surface of operative wound had broken down and contained two ounces of purulent material. In this region there was a localized peritonitis from

which *B. coli* were recovered. The liver weighed 1,620 grm. and appeared browner than normal. At the junction of the cystic and common ducts, a hard, irregular mass was felt which extended toward the ampulla of Vater for a distance of 2 cm. (Fig. 3). A few firm nodules were palpated along the cystic duct. The head of the pancreas felt normal, and no nodules were felt in the region of the ampulla of Vater. The gall bladder was normal in size and contained one ounce of white bile. Pressure on the gall bladder forced bile to appear in the duodenum *via* the ampulla. Although the new-growth was definitely identified with the common duct a probe could be passed into the hepatic duct without meeting obstruction, and the cystic duct also readily admitted a probe. When the common duct was opened the tumour was seen invading its wall and extending into the adjacent tissue for 2.5 cm. (Fig. 4). The intra-ductal portion of the tumour was sessile and rather papillomatous, with its base smaller than the projecting portion, suggesting that it might have been a benign papilloma at one time. There were no stones in the ducts or the gall bladder. The hepatic duct above the carcinoma was but slightly dilated, and the common duct below the tumour, as also the pancreatic duct, showed no abnormality. The cystic duct was patent, but the newgrowth was seen invading its wall and extending for a distance of one centimetre toward the gall bladder. The portal vein was uninvolved. The superior surface of the liver showed a fibrinous exudate, but no tumour. The intra-hepatic bile ducts were deeply bile stained and dilated to three times their normal size. Numerous white umbilicated tumour nodules were scattered over the cut surface. Microscopically, the common duct was extensively invaded by tumour, which, in places, infiltrated the wall completely and extended into the periductal tissues. In the duct lumen there was a large mass of an irregular glandular structure, with diffuse connective-tissue stroma. The tumour was a typical adenocarcinoma with abundant mucus formation, which, in places, seemed to have replaced tumour cells. The periductal tissues showed invasion with carcinoma of a similar character. The gall bladder showed chronic inflammation, but no tumour. The lymph nodes along the cystic duct showed metastatic carcinoma like that seen in the common duct. The liver presented the picture of biliary stasis, congestion, and a rather diffuse cholangitis, but there was no cirrhosis. Numerous metastatic deposits of typical adenocarcinoma with abundant mucus formation were seen throughout the sections. *Pathological diagnosis.*—Adenocarcinoma at the junction of the common and cystic ducts, with extension along the latter; metastatic carcinoma in the regional nodes and in the liver; chronic cholecystitis; hepatitis and fatty degeneration of the liver; arterio-sclerotic kidneys; acute localized peritonitis.

FIG. 3.—*Case 3.* (A-30-323) To show primary tumour at junction of the common, hepatic and cystic ducts with extension into the latter.

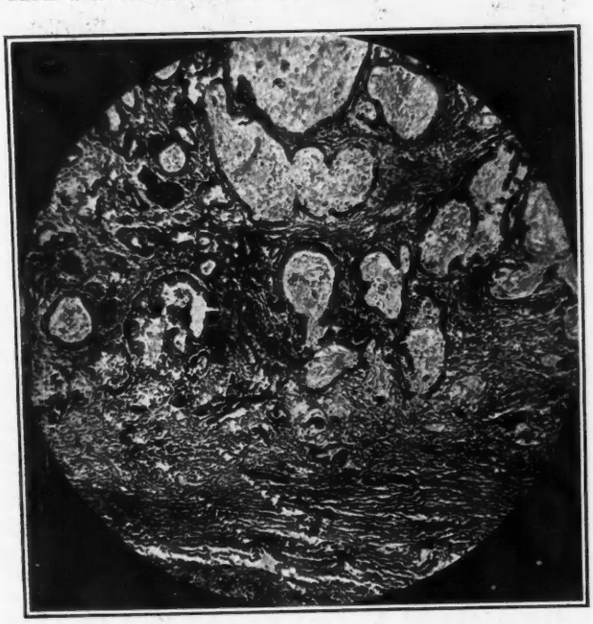

FIG. 4.—*Case 3.* (A-30-323) From tumour of the duct to show gland-formation with over-production of mucus.

CASE 4

P. C., male, aged 61, was admitted to the service of Dr. A. T. Bazin on January 22, 1931, complaining of gradual loss of appetite for six months, increasing constipation for six months, progressive jaundice for three months, pruritus, loss of weight and strength. Family history, negative. There was no history of symptoms referable to the gastro-intestinal tract. He had used beer in moderation all his life. In June, 1930, the patient had a vague digestive upset, characterized by decrease in appetite and an empty feeling before eating, which was unnatural for him. He was told at this time that his eyes were slightly yellow. His bowels, previously regular, became constipated and gaseous eructations became a feature. Foods containing fat were troublesome. Six weeks before admission he became very definitely jaundiced. This was particularly marked for two weeks, then became somewhat less, and varied from day to day during the month before admission. Pruritus appeared, the urine became dark, and the stools clay-coloured. The patient had lost 20 pounds in the two months prior to admission. There was no pain at any time.

Physical examination.—On examination there was very deep jaundice. No glandular adenopathy. The abdomen was regular in outline, and, while there was no tenderness, there was a definite sense of resistance in the right upper quadrant. A deeply seated palpable mass extended from the vertical plane of the anterior superior spine, to the midline of the abdomen, and inferiorly to the umbilicus. The mass was firm, slightly nodular and moved with respiration. No other masses. Rectal examination negative. The urine contained bile, sugar and an occasional granular cast. Bleeding time 5 minutes; clotting time 12 minutes (normal 10 minutes). Platelets 246,000. Gastric analysis showed free HCl 13; total acidity 31, no blood. The stools were clay-coloured; no blood; microscopic examination negative. The van den Bergh test was positive (indirect), 14 units. Blood

sugar, 112 milligrams. Urobilinogen in the urine present in less than 1 in 10 dilution. A flat plate of the abdomen showed no calculi. A barium series was negative. The patient was transfused and exploration undertaken. The pre-operative diagnosis was obstructive jaundice due to malignant disease, site not definite. Under intratracheal ether anæsthesia, Dr. A. T. Bazin operated on January 29, 1931, seven months after the onset of symptoms, and three months after the definite appearance of jaundice. The abdomen contained a small amount of bile-stained fluid. The liver was enlarged, engorged and deep violet in colour. Studded over its surface were numerous dark discrete spots wheih were thought to be dilated bile capillaries. The gall bladder was not distended, was thin walled, and contained no stones. The cystic duct, the common duct including the ampulla of Vater, and the hepatic ducts as far as was possible were examined, without finding any lesion. The stomach and duodenum were normal. The head of the pancreas was firm, though not enlarged. Hard lymph nodes were palpable in the retroperitoneal space along the upper margin of the pancreas. A cholecystogastrostomy was done rather than an exploration of the common duct, as it seemed that the obstruction was due to chronic pancreatis occluding the common duct in its passage through that organ. A culture of bile taken at operation was sterile.

Post-operatively, the patient developed a septic temperature which continued until his death on the tenth day. He became practically anuric, and on the eighth post-operative day the blood urea was 80 mgrm., and the creatinine was 2.45 mgrm. The urine showed no sugar, albumin graded ++, and there were many large granular casts. The following day the blood urea was 97 mgrm., and the creatinine 3.06 mgrm. Dr. Rabinowitch, of the Department of Metabolism, saw the patient and in view of the anuria, the rapidly rising blood urea, and the much slower rise in the creatinine considered that there was a marked hepatitis in addition to an acute degeneration of the tubular epithelium of the kidneys. Several times on the tenth day after operation, the patient passed a quantity of dark blood by bowel. After vomiting 1,000 c.c. of dark blood, he expired on February 7, 1931, seven and one-half months after the onset of his symptoms and ten days following operation.

Abstract of autopsy.—A poorly nourished man with extreme icterus. One litre of slightly blood tinged fluid in the peritoneal cavity. There had been some hæmorrhage into the surgical incision, but no peritonitis. The omentum was adherent about the site of the cholecystogastrostomy. No mass palpable in the gastro-hepatic omentum or in the head of the pancreas, though the latter felt slightly firmer than normal. On the anterior surface of the liver, to the left of and slightly behind the insertion of the round ligament a small hard white nodule 0.5 cm. in diameter was seen. Frozen section of this nodule made at the autopsy showed adenocarcinoma of the type usually seen in bile-duct carcinoma. The common and cystic ducts showed neither dilatation nor tumour. The common hepatic duct was not dilated, but at the junction of the right and left hepatic ducts there was a thickened firm white mass, especially prominent about the left hepatic duct. Opening the hepatic ducts, a firm yellowish-white tumour mass was seen completely surrounding and invading the left hepatic duct, almost occluding its lumen (Fig. 5). A probe inserted through this mass into the left hepatic duct met an obstruction 2 cm. above the bifurcation of the common hepatic duct, and following this procedure, thick purulent material escaped from the duct above, (Fig. 6). The right branch of the hepatic duct was definitely dilated and its orifice at the junction with the left hepatic duct was almost completely occluded by tumour. Opening the right hepatic duct, a probe could be passed far up the radicals of this duct into the right lobe of the liver. No obstruction was encountered and no pus escaped following this procedure. Beneath the liver capsule several small soft yellowish areas were seen which on section discharged thick tenacious pus. On section the liver presented a striking greenish black colour, due to biliary stasis. The distended bile ducts contained thick yellowish brown pus. The gall bladder was thin walled and its mucosa was intensely injected and congested.

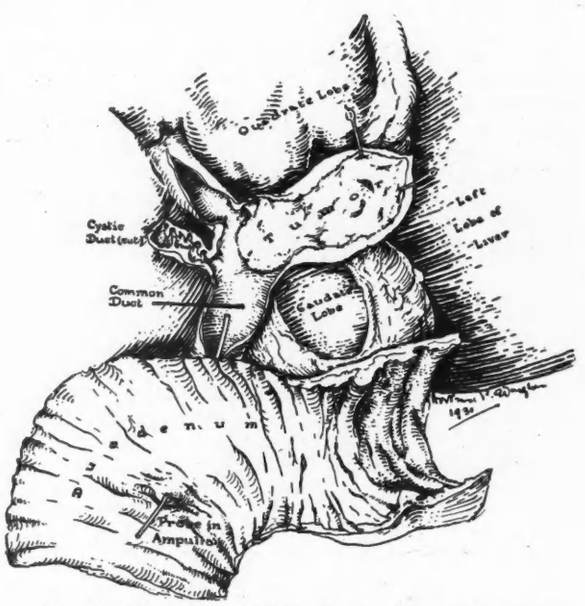

FIG. 5.—*Case 4.* (A-31-25) To show primary carcinoma in the left hepatic duct with extension into right.

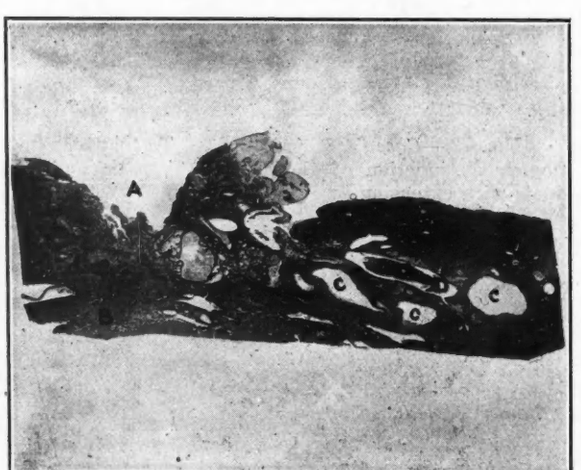

FIG. 6.—*Case 4.* (A-31-25) Section through the left hepatic duct and surrounding tissue. Open duct with carcinoma in the wall at "A". Liver "B" "B" "B"; dilated bile ducts "C" "C" "C"; one "D" filled with pus.

Microscopically, the left hepatic duct showed a carcinoma diffusely infiltrating its wall and extending into the periductal tissues. All the bile ducts proximal to the lesion were greatly distended with purulent material. The tumour cells were of the columnar type, with a definite tendency toward gland formation. Connective tissue in the tumour was prominent, giving it an almost scirrhous appearance. There was a noticeable absence of mucus. The liver tissue adjacent to the tumour in the hepatic duct was invaded and compressed. The liver cords were definitely degenerated, the cells vacuolated,

and there was a diffuse infiltration with polymorphonuclear leucocytes and lymphocytes. One rather large nerve trunk, lying in the liver tissue near the hepatic duct, was invaded by tumour cells and its Schwann cells were very definitely hyperplastic (Fig. 7). This latter change was probaby due to the irritation of the tumour cells. The liver generally showed a diffuse fibrosis not limited to the perilobular areas. There was a rather extreme degree of acute degeneration in places, similar to that seen in cases of early acute diffuse hepatic necrosis. This lesion could explain the biochemical findings which at one time suggested those found in early acute yellow atrophy. The blood vessels in general were free from exudate and tumour, but several definite tumour cells and some purulent material were seen in one vessel. *The pathological diagnosis* was primary carcinoma of the left hepatic duct, with involvement of the right hepatic and common hepatic ducts; metastasis in the liver; purulent cholangeitis; passive congestion and biliary stasis in the liver.

FIG. 7.—*Case 4.* (A-31-25) Section through the liver near the left hepatic duct, taken at E, Fig. 6. Longitudinal section of a nerve "A" surrounded and infiltrated by carcinoma. Note the well-formed glands.

CONCLUSIONS

1. Benign tumours of the extra-hepatic bile ducts are uncommon.
2. Malignant tumours occur in a ratio of approximately 1:4 to gall-bladder carcinoma.
3. Gall stones are present in one-third of the cases and are probably an important etiological factor.
4. Men are more frequently affected than women; the ratio is 3:2.
5. The illness usually begins during the 5th or 6th decade with painless progressive jaundice.
6. Early surgical intervention offers the only hope of relief.
7. The surgical treatment of cholelithiasis, with or without symptoms, would seem indicated if the mortality from bile-duct and gall-bladder carcinoma is to be reduced.

NOTE: In addition to the following references an extensive bibliography has been compiled by the author and may be had on application to him.

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METHYLENE BLUE PROVES AN ANTIDOTE TO CYANIDE POISONING.—A patient was recently brought into the Park Emergency Hospital in San Francisco in a state of coma after taking potassium cyanide. Methylene blue was injected into a vein and fifteen minutes later he had recovered completely. In reporting the case to the American Medical Association, Dr. J. C. Geiger, Director of Public Health for San Francisco, pointed out that the use of the dye was the direct result of a survey of the treatment of poison cases of all kinds as practised by the Emergency Hospital Service of the Department of Public Health. The survey was made by Dr. P. J. Hanzlik, professor of pharmacology at Stanford University School of Medicine, and Dr. C. D. Leake, professor of pharmacology at the University of California Medical School. In commenting on the recommendations of Dr. Hanzlik and Leake, Dr. Geiger said that the use of methylene blue and of other dyes was suggested by studies of Dr. Otto Warburg and others.—*The Diplomate*, 1933, **5**: 15.

PSEUDOMYXOMA PERITONEI ORIGINATING IN A MUCOCELE OF THE APPENDIX*

BY H. H. PITTS, M.D., C.M. AND E. A. GEE, M.D.,

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THE occurrence of pseudomyxoma peritonei in males seems sufficiently infrequent to warrant the report of this case. Unfortunately the patient was a man of mystery and would not disclose his real identity or give any history of past or present illness, and he made one attempt at suicide by slashing his throat and wrists with a safety razor blade.

J. S., (C64864S), male, aged approximately 50 years, was admitted to the Vancouver General Hospital on August 16, 1932, in an unconscious condition. He had been found in a hotel room. He had not been seen for several days and it was suspected that he had been drinking heavily. On recovering consciousness he tried to hide his identity and persistently refused to give an account of his illness.

Physical examination.—The patient was markedly emaciated. His temperature varied from 98° to 100.2°; pulse 80 to 120; respirations 20 to 30. Except for the abdomen, the examination was essentially negative. The liver was displaced upwards, encroaching on the thoracic cavity.

The abdomen was greatly distended and did not move with respiration. A healed left mid-rectus incision was noted and numerous dilated veins were present over the surface of the abdomen. A large mass was palpable in the region of the umbilicus, extending upwards to the left upper quadrant. It was movable, of irregular shape, and of a doughy consistency. A mass, presumed to be liver, was palpated in the right upper quadrant, extending one hand's breadth below the costal margin; large palpable nodules were present in it. Small nodules were palpable beneath the whole anterior abdominal wall. The percussion note over the large masses was dull, but over the right side of the lower abdomen, resonant. There was no evidence of a large collection of fluid in the abdomen.

On rectal examination the prostate was found to be enlarged and firm, one walnut-sized lobe being firmer than the rest of the gland. The anterior wall of the rectum was very hard and suggested small nodules on the peritoneal surface. The urine was acid to alkaline in reaction; specific gravity 1010 to 1020; albumin +2; white blood cells +3; hyalin casts +2.

A diagnosis was made of colloid carcinoma of the stomach, with extensive metastases, rendering operation inadvisable.

The patient was given symptomatic treatment, chiefly for frequent vomiting and gnawing abdominal pain. Enemata occasionally gave some relief. Considerable morphine was finally required. He developed a bronchopneumonia and died on October 9, 1932.

Autopsy.—The body was that of a well developed but extremely emaciated white male. The abdomen was markedly distended and presented a somewhat doughy, and, at the same time, rather finely lumpy feel. There was an old healed left mid-rectus incision, but otherwise external examination was negative.

The lungs showed some œdema and patches of bronchopneumonia. The domes of the diaphragm were markedly elevated, to the level of the third ribs on either side. The heart was of normal size. The valves were all intact; very slight sclerotic changes were noted in the coronaries and aorta and the musculature was rather soft. On opening the peritoneal cavity it was seen to be absolutely filled with a yellowish-white gelatinous material that in places hung in grape-like masses from the intestinal serosa, the parietal peritoneal wall, and the mesentery. The coils of intestine were somewhat distended and were matted together by these gelatinous masses, and in the entire upper quadrant the liver, transverse colon, stomach, and spleen, were completely enveloped in this honeycomb-like mass of gelatinous material. It was only by cutting through this material that the various structures could be discerned. The omentum was rolled into a mass, 5 inches in thickness, and showed practically no fatty elements, simply a solid mass of this gelatinous material. The inferior surface of the diaphragm and the surface of the liver was covered with a layer of this material, on the average 1 inch in thickness, but it did not actually infiltrate the diaphragm or the liver parenchyma. It was extremely adherent to all structures and actually infiltrated none of them, but was present simply on the capsule or serosa. In the areas where it was in masses, there was considerable organization, as though from some inflammatory reaction, and it presented a firmer feel. The

FIG. 1.—Photo taken after the body was opened, showing the extensive gelatinous and polypoid deposits throughout the peritoneal cavity, with the glass-like appearance over the upper quadrants, completely obscuring the stomach, liver, etc. The high position of the diaphragm can be noted and the marked emaciation of the subject.

* From the Laboratories of the Vancouver General Hospital, Vancouver, B.C.

entire gastro-intestinal tract was opened from œsophagus to rectum and there was no evidence of any carcinomatous process of the colloid or mucoid type found in any area, but about 1.5 cm. of the proximal portion of the appendix was present, the lumen of which, at its junction with the cæcum was occluded, and distal to this, for a distance of 1 cm., the lumen was distended and smooth, as though the mucosa were atrophic. Distal to this, again, was a semi-solid mass, the size of the fist, identical with the other masses of gelatinous material, which had completely replaced the distal portion of the appendix and appeared, without doubt, to have originated in a mucocele of the appendix, with resulting so-called pseudomyxoma peritonei. This seemed especially confirmed by the presence of the constriction at the proximal portion of the appendix, the dilated atrophic appearance just distal to this constriction, and the absence of any colloid carcinomatous process anywhere in the gastro-intestinal tract.

The spleen was of normal size and, as previously mentioned, was completely enveloped in this gelatinous material. The left kidney was about twice the normal size and its pelvis dilated; on section, four large greyish-white calculi, of the staghorn type, each about the size of a small pigeon's egg, but rather flattened, were seen. The calyces were dilated and there was considerable purulent material in the pelvis and calyces. The remaining parenchyma appeared to be rather turbid. The right kidney presented a relatively normal gross appearance. The pancreas and adrenals also appeared fairly normal. The bladder and prostate showed no gross lesions.

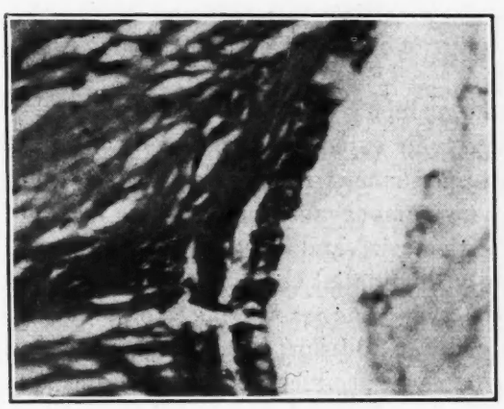

FIG. 2.—A high-power microphotograph showing a layer of the tall columnar mucous cells lining occasional trabeculæ, found in collections of the gelatinous-appearing material quite remote from the appendix.

Diagnosis.—Extensive pseudomyxoma peritonei, originating from a mucocele of the appendix; calculous pyonephrosis (left); bronchopneumonia (right).

Microscopical findings.—A great many sections were taken through the gelatinous material from the various portions of the peritoneal cavity, and they showed an almost identical picture in all instances. Relatively fine fibrous tissue trabeculæ, enclosing masses of homogeneous amorphous material, staining either a lilac or a faint pink colour, were seen, with, here and there, small aggregations of tall, uniform, columnar epithelial cells in single layers, many showing mucoid droplets, lining the trabecular stroma (Fig. 2). These were the only cellular elements seen in any of the sections, and were very infrequent. In sections taken through the hilar portion of the liver and spleen, the gelatinous material was seen to be present in cleft-like areas in the tissue, but not actually infiltrating the parenchyma proper. Quite marked parenchymatous degeneration was present in the liver, and extensive hæmorrhagic extravasation and congestion was noted in the spleen. Sections through the left kidney showed very extensive parenchymatous degeneration, congestion of the glomerular tufts, and diffuse and fairly abundant polymorphonuclear and plasma cell infiltration, with also accompanying lymphocytic infiltration.

A large number of sections were taken through the remnant of the appendix with its surrounding mantle of gelatinous material, and these show complete loss of the appendiceal mucosa (Fig. 3), but the submucosa and muscularis were still well defined, and there was no infiltration of the myxomatous material into the various coats. Covering the serosa were seen the masses of pseudomyxomatous material, interspersed with fibrous trabeculæ, similar to that seen in the sections through the other portions of the peritoneal cavity.

Diagnosis.—Ruptured mucocele of appendix, with resulting pseudomyxoma peritonei.

Attention was first called to this bizarre appearance of the peritoneal cavity in connection with ruptured or perforated pseudomucinous cystadenomata of the ovary by Werth, and we owe our first complete description to him which was reported almost fifty years ago. His description in part is as follows, "A change in the peritoneum which is a complication of ovarian cysts. It is caused by a peculiar reaction of the peritoneum to the jelly-like material

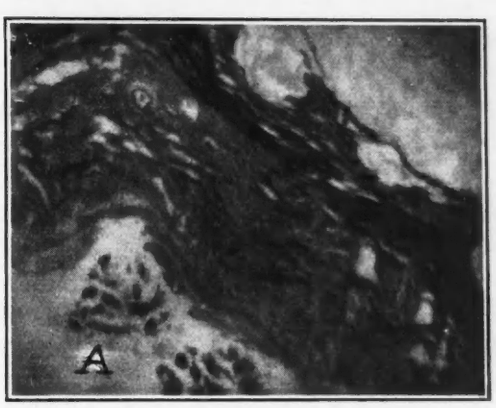

FIG. 3.—A low-power microphotograph taken through the appendix, distal to the constricted area, showing complete loss of the mucosa with masses of gelatinous material adherent to the serosa. "A" represents the lumen of the appendix.

which has escaped into the peritoneal cavity by way of spontaneous perforation of ovarian cysts. At the operation or autopsy in these cases the peritoneal cavity is found filled with gelatinous material in its entire extent. The material is found partly lying free, partly in the form of thick semi-transparent layers, lying on and firmly attached to the abdominal wall and the intra-abdominal organs. The masses contain delicate connective-tissue membranes and fine vessels. At times the gelatinous substance is enclosed in a delicate connective-tissue membrane and forms especially on the intestine polypoid pedunculated structures."

It was not until 1901 that Fraenkel first described a similar process in males originating from a ruptured mucocele of the appendix. Since then other cases have been reported, several in women, where the condition was consequent to both ovarian cyst and mucocele of appendix rupture. A case has also been reported originating from an umbilical tumour of the omphalomesenteric duct. Emil Reis,[1] of Chicago, gave a full description of two of his own cases and a full review of the literature up to 1924 and there appears to have been little of importance added since then. With so thorough a review and discussion of the condition it seems unnecessary to repeat it here.

In the microscopic examination of many of the sections from our case, small islands of tall, columnar, mucus-producing epithelium could be found in locations quite remote from the appendix, and this fact would suggest that they are implants of appendiceal mucosa which have retained their secretory function in their new environment. While this process is not histologically malignant, it is certainly so in its manifestations.

There appear to be no criteria by which preoperative diagnosis may be made, and even at laparotomy a diffuse colloid carcinoma of gastric or colonic origin cannot be excluded without a thorough exploration of these sites. When the condition is so advanced the prognosis would seem to be absolutely unfavourable.

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CARCINOMA OF THE BRONCHI*

BY J. C. MEAKINS AND J. W. MACLEOD,

Montreal

THE importance of carcinoma of the bronchi may be best appreciated by the general statement that its incidence has supposedly increased from roughly 1.5 per cent of all carcinomata to approximately 12 per cent. That this is an actual increase there are important reasons to doubt, particularly mistaken histological diagnoses in the past. These will be discussed presently. But even making allowance for this source of error there would appear to be considerable increase in its incidence, although not so great as stated above. Even if the increase were only up to 6 per cent of all carcinomata it would behoove the medical profession to take thorough stock of what is known about this condition, particularly as to its early recognition and possible methods of radical treatment.

In addition to the rather loose and inaccurate histological diagnosis of tumours of the lung up to recent times, there was an even more generalized classification, from the clinical standpoint. The diagnosis covered practically all malignant tumours, no matter where they originated, and no attempt was made to distinguish between the signs and symptoms due to the primary bronchial tumours and those due to their extension to other structures, or to intra-pulmonary lesions dependent on the primary tumour, such as "chronic bronchitis," bronchiectasis, and lung abscess. These last usually dominated the clinical picture, and led to the true diagnosis being mistaken or long delayed. In addition, the tendency of bronchial carcinoma to produce wide-spread and striking metastases still further clouded the true condition of affairs. As a result, much of the clinical material available in the earlier records of a hospital is of doubtful value, and it is unwise to include such cases in a critical analysis of the subject. Therefore, only cases with a careful autopsy record, or at least a biopsy, are included in the present communication, and even in the latter case but few were permissible of admission. The material consists of 16 cases complete with autopsies, and 3 with biopsies.

FREQUENCY

Reference has already been made to an increased frequency of bronchial carcinoma. It is not necessary to go exhaustively into this question, except to mention a few records of others. Schuster[10] from the records of the

* Read at the Sixty-third Annual Meeting of the Canadian Medical Association, Toronto June 22, 1932.

Royal Chest Hospital collected 6 cases between the years 1917 and 1922, and 20 cases between 1923 and 1928. McCrae, Funk and Jackson[6] collected 128 cases between 1913 and 1923, and in addition reported 14 of their own.

In the present series the onset of two cases occurred between the years 1917 to 1921, five between 1922 and 1926, and ten between 1927 and 1931. If the 16 cases with autopsy are considered alone they occur in the quinquennial periods and in proportion to the total autopsies as follows:

TABLE I.

Years	*Cases*	*Total Autopsies*	*Ratio*
1917-1921...	2	942	1 to 476
1922-1926...	4	1,325	1 to 331
1927-1931...	10	1,729	1 to 173
	16	3,996	1 to 250 (0.4%)

The number of cases is too few to warrant any dogmatic statement, but it may at least be said that the apparent increase is suggestive.

SEX AND AGE

It is the usual experience that the incidence amongst males outnumbers that in females in the ratio of about 3 to 1. The present series substantiates this, as there were 14 males and 5 females. As years pass, the conception that the great majority of malignant tumours develop after the fiftieth year is receiving many rude shocks, and carcinoma of the bronchus affords no exception. McCrae found that in a series of 61 cases, diagnosed either by autopsy or biopsy, about 50 per cent were under the 46th year. In the present series the ages of onset were as follows.

TABLE II.

Age Periods	*Number of Cases*	
35 and under	2	47%
36 to 40	4	
41 to 45	3	
46 to 50	2	53%
51 to 55	2	
56 to 60	2	
61 to 65	4	

This closely corresponds to the result found by McCrae.

ETIOLOGY

The reason for the apparent increase of bronchial carcinoma has stimulated investigation as to its probable etiology. Many inflammatory, chemical, mechanical and radio-active agents have been suggested as possible causes. Much interest has been aroused by the studies of Schmarl into the carcinoma of the lung which occurs amongst the workers in the Schneeberg mines in Saxony. In these mines cobalt, bismuth and arsenic are obtained. There is a great deal of dust and the miners usually suffer from pneumonokoniosis. In addition this dust contains about 0.45 per cent of arsenic, while the air in the mines is definitely radio-active, having an emanation content of 50 Mache units. In other mines where bismuth and cobalt only are produced this disease does not occur, while in many occupations where pneumonokoniosis is common it does not show an undue incidence. Attention has been directed experimentally to the rôle played by arsenic and the radioactivity of the dust, but so far experimentation with mice has been unsucessful. By analogy it would appear that the radioactivity is probably the more likely cause. Maretand, in his communication on "Malignancy in Radioactive Persons," quotes Teleky in referring to the osteo-sarcoma of radium dial workers, "I think it to be analogous to the pulmonary cancer of the workman of Joachimsthal in Böhmen and perhaps at Freiburg in Saxony (Schneeburg)." Möller[7] produced primary lung cancer in 25 per cent of mice by painting their backs with tar. Murphy and Sturm[8] confirmed this in 69 per cent of their experiments on mice. The inhalation of fumes has not, up to the present, produced similar results.

Tuberculosis has been held by some to be an important cause. Ewing,[3] in particular, holds this belief, and it is also favoured by Sampson Handley.[2] Primrose[9] in 1920 called attention to the frequent association of tuberculosis and cancer of the appendix. Warthin,[11] in one of his last publications upon the "Heredity of Carcinoma in Man," draws attention to family histories showing an association of cancer and tuberculosis.

If tuberculosis predisposed to cancer it would be expected that this direct association might

frequently be found in the lungs. So far this does not seem to be the case. The influence of other pulmonary lesions such as influenza and gassing during the last war has been mentioned, but there is not sufficient evidence to support either of these contentions.

The influence of the changes in our environment has been stressed by some. They have pointed to the increase of dust and soot in the atmosphere, the presence of gasoline fumes, and the products of the internal combustion engines. But these are but possible factors, and an analysis of the cases recorded in the literature does not indicate any reasonable association. For instance, carcinoma of the bronchi is not particularly common in miners, either coal or quartz (except as mentioned above), or in garage workers.

Brockbank[1] has made an analysis of the occupations of 898 patients with primary lung cancer as recorded in the literature. The sole conclusion he could arrive at was the suggestion that the labouring classes predominate. In 62 cases studied in detail he found that 14.5 per cent were employed in the dusty occupations and 24 per cent worked amongst gases and fumes. He draws attention to the danger of placing too much credence in the patient's statement, as he will usually mention his last employment, no matter how brief. He emphasizes the importance of obtaining a complete life-history of occupations, and minute details of what each might entail. He points out instances of men who had worked in the Schneeberg mines but had given up this work on account of lung trouble (presumably pneumonokoniosis) and who developed lung cancer ten to eighteen years later, from which they died.

In the present series the details of occupation were gone into as thoroughly as possible. In three cases the temporary character of the employments made any classification impossible. The presence of any past or present indications of tuberculosis, influenza, gasing or injury (Table III) was also carefully noted. There are two points of special interest to be noted. Case 17 was a young man, a plasterer by trade, who received a severe blow over the upper portion of the sternum four months before the onset of his pulmonary symptoms and nine months before his death. Case 9 was a woman, aged 64, who swallowed a straight steel pin twenty-two years before. This was never recovered, but was noted in the x-ray to be in the pulmonary lesion from which it was recovered

TABLE III.

No.	*Age*	*Occupation*	*Tuberculosis*	*Influenza*	*Miscellaneous*
1	41	Housewife	None	None	None
2	45	Engineer	Chronic apical tuberculosis	?	Anthracosis
3	64	Housewife	Maternal tuberculosis	None	None
4	56	Tailor	None	None	None
5	60	Indefinite	None	None	Anthracosis
6	62	Plasterer	Tuberculosis of mediastinal glands	None	None
7	41	Machinist	None	None	Anthracosis
8	54	Indefinite	None	Pneumonia	Chr. bronchitis
9	64	Housewife	None	None	Foreign body (pin) in side of neoplasm
10	65	Housewife	None	None	None
11	60	Teacher	Tuberculous glands removed 8 years ago	None	None
12	41	Machinist	None	None	Anthracosis
13	43	Labourer	None	None	None
14	51	Janitor (dusty)	Caseous pulmonary tuberculosis	None	Chr. bronchitis Wassermann ++++
15	34	Clerk	None	Twice	Chr. bronchitis since influenza
16	68	Peddler	Caseous tuberculosis	None	Chr. bronchitis 40 years Wassermann +++
17	30	Plasterer	.....	.....	Blow on sternum 4 mos. before onset
18	61	Indefinite	.....	.....	Wife died of cancer.
19	49	Druggist	.....	.....	.....

Cases 17, 18, and 19, were proved by biopsy only.

at autopsy. In the case of the other patients there is nothing particular to note in their occupations or histories, except that 5 of them showed definite evidence of active tuberculosis. Case 11 is of particular interest, in view of a reference made above. In 1918 Doctor Primrose, of Toronto, removed a small caseating indurated mass adjacent to the outer side of the right breast and also lymphatic glands in the axilla. These proved on histological examination to be tuberculous.

PATHOLOGY

It is not my purpose to discuss the pathology of these tumours in detail. But a few general remarks would not be out of place. Up to 1915 carcinoma of the lungs was considered a rare histological finding, sarcoma being the malignant tumour most frequently described. This was of a small-celled variety and was supposed to arise from the alveolar cells. Studies of the past fifteen years have thrown grave doubts upon the supposition that there really is a distinct alveolar structure, while the occurrence of a distinctive alveolar sarcoma is held to be not proven. There has been a strong movement to group all carcinoma of the lungs as arising from the bronchial epithelium and their mucous glands. This has been strongly sponsored by Klotz,[4] Weller,[12] Schuster,[10] and others. They claim that the various cellular forms can all be related on a broad biological conception. All of the cases fall into three main groups; namely, (1) the high columnar celled tumour, which has a strong tendency to contain mucoid cells; (2) the polymorphic, including squamous and polygonal cells; (3) the small-celled tumours which formerly were classed as sarcoma.

In the present series, 11 were of the first, 6 of the second, and 2 of the third type. This is a broad classification, as in a number of instances it was difficult to state whether they might be classed as first or second type, or in others whether they should be classified with the second or third type. It is important to examine a number of large sections before arriving at a final conclusion. In 5 of the cases considerable mucin was present in the cells, and in some this was found free about the tumour masses.

The situation of the primary tumour was possible of localization in 15 of the 16 autopsy cases. Ten were in the right lung, of which 5 were in the main bronchus, 4 at the second division, and 1 confined to the right upper bronchus. Of the 5 in the left lung 2 were situated in the main bronchus close to the tracheal bifurcation; 2 were in the left upper bronchus, and 1 in the left lower bronchus. As will be pointed out later, the situation of the primary growth has an important bearing on the symptomatology and course of the disease.

SYMPTOMS AND SIGNS

The majority of the clinical descriptions of carcinoma of the bronchus leave us in a hopeless state of mind in regard to its early recognition. The reason for this is that the symptoms and signs of carcinoma of the bronchus are confused with those of secondary pulmonary lesions which may ensue and those which result from metastasis in neighbouring or far distant tissues.

As the lesion under present discussion is a disease of the bronchus we would expect the earliest indications to be bronchial and respiratory in character. The natural response to interference with bronchial function or irritation of its mucous membrane is cough. In the present series cough, with or without sputum, was the symptom of onset in 15 of the 19 cases. The cough was persistent, increasing in severity, and often occurred in severe

TABLE IV.

No.	*Symptoms of Onset in Order of Appearance*
1.	Cough, dyspnœa
2.	Loss of memory
3.	Pain in left hip
4.	Cough, sputum, dyspnœa, hæmoptysis
5.	Cough, intense dyspnœa, foul sputum
6.	Cough and dyspnœa (paroxysmal); sputum, thick mucoid
7.	Cough (paroxysmal), sputum (purulent), hæmoptysis,
8.	Headache, paroxysmal dyspnœa
9.	Cough, sputum, hæmoptysis
10.	Cough, paroxysmal dyspnœa, hæmoptysis
11.	Paroxysmal cough, sputum (mucoid), hæmoptysis
12.	Cough, pleuritic pain in right chest
13.	Cough, sputum (mucoid), dyspnœa, hoarseness
14.	Cough (paroxysmal), sputum (thin, later foul)
15.	Cough, sputum, hæmoptysis
16.	Cough, dyspnœa, hæmoptysis
17.	Cough, watery sputum, pain in chest
18.	Cough, mucoid sputum, pain in chest
19.	Left pleurisy

Cases 17, 18, and 19 were proved by biopsy only.

paroxysms closely resembling either the expiratory effort of whooping cough or of bronchial asthma. In the 4 cases in which cough was not the symptom of onset a considerable time had elapsed before the patients came under observation, and other more poignant symptoms had developed.

In Case 2 there was complete loss of memory and mental orientation due to cerebral metastasis. In Case 3 two years had elapsed since the onset of lumbar and pelvic pain due to bone metastasis in these regions. The woman was in a most pathetic condition on admission and a coherent history could not be obtained. In Case 8 there was also cerebral metastasis, but the history seemed fairly definite that headache was at least the most striking indication, although it should be noted that the man had had chronic bronchitis for many years, which may have masked the onset of additional bronchial symptoms. In Case 19 the first pulmonary symptom recorded was a pleuritic pain due to a pleurisy four years previously. In the intervening period cough became troublesome, the period of onset being indefinite.

The paroxysmal character of the cough is probably to be explained by the presence of a lesion acting as a foreign body and thus leading to bronchial spasm. This would also explain the frequent presence of dyspnœa. The severe or paroxysmal dyspnœa which occurred in 4 of the cases is to be accounted for by the fact that the primary lesion was either at or close to the bifurcation of the trachea thus producing intermittent tracheal obstruction.

The presence of sputum of a particular character was noted by 12 of the patients. That it was present in all, to a greater or less extent, may be taken for granted, but it would only be when it was either unpleasantly copious or peculiar in colour or odour that it would be noted as an unusual event. It is unfortunate that a more detailed description of the early character of the sputum could not be obtained. It might be of some help towards indicating the type of tumour present, but before ulceration of the tumour or bronchiectactic suppuration had occurred, as then the character of the sputum would be modified by hæmorrhage or exudate.

Hæmoptysis is a relatively late symptom. It seldom occurs as a primary manifestation if a careful history is obtained. The spectacular nature of the event may push less conspicuous symptoms into the background. In only one (No. 9) of the cases here reported was it placed by the patient as the first symptom and then in combination with cough. Profuse hæmoptysis may occur when the tumour has ulcerated, or when bronchiectactic cavities have formed distal to the tumour and a large traversing vessel has been ruptured. Fatal hæmorrhage did not occur in this series.

Stridor.—The presence of a faint wheezing sound on respiration when the ear is placed close to the open mouth may be due to tenacious secretion or to partial obstruction to the trachea or a main bronchus, and may vary in intensity from time to time. Although significant, it can only be taken as an indication for further investigation. If, however, a distinct stridor is present, when the larynx is known to be free and other obvious causes in the upper respiratory passages are absent, it points to one condition only, namely, a tumour or other foreign body obstructing the trachea at its bifurcation. The degree of respiratory distress and cyanosis will give a fair indication of the degree of interference with respiratory function. Gradual obstruction of one bronchus will not produce respiratory symptoms.

Signs.—The symptoms of bronchial carcinoma are of greater importance than the signs. These are comparatively insignificant and are not to be relied upon. If the neoplasm should produce early obstruction of a bronchus then the signs of atelectasis may be detected. But they are no different from those of atelectasis due to any other cause. If definite evidence elicited by physical examination is waited for an early diagnosis will never be made. If early diagnosis is to be made more direct methods of examination must be used.

Roentgen ray.—It is seldom that a flat plate of the chest will give early evidence of a bronchial tumour. By "early" is meant the period before there is involvement of the peribronchial or mediastinal lymph glands or invasion of the pulmonary tissue. A stereoscopic view will do so at times, but so seldom that little faith can be placed in a negative result.

Visualization with lipiodol.—As a bronchial tumour usually protrudes to some degree into

the larger bronchi, or even obstructs the smaller bronchus at an early stage, it is but reasonable to attempt to demonstrate such a lesion by visual contrasts. This is best done by a systematic injection of lipiodol in each lobe until the tumour, if any, is located. The technique is comparatively simple and a number of methods have been described. The more complicated depend upon the use of the bronchoscope, and, as will be shown below, this is the most advantageous procedure. But often this is impractical and in unskilled hands gives far from satisfactory results. The simpler methods depend upon the distribution of the lipiodol into the different bronchi by gravity after it has been introduced into the trachea. Another method is by inserting a soft rubber catheter down the trachea to near its bifurcation, and then introducing the lipiodol, with the patient properly postured so that it will gravitate into the bronchi as desired. By this means narrowing or obstruction of bronchi in any part of the lung may be detected. It has one advantage over the bronchoscope in that it is simple of execution.

The bronchoscope.—This is by far the most perfect instrument for the detection of bronchial neoplasms, particularly when situated in the main stems or up to the second division. Not only can the tumour be seen and its character noted but pieces can be removed for histological examination, which is impossible by any other but direct operative means. Further, if the tumour be situated beyond the horizon of the bronchoscope, careful inspection of the secretion from the bronchi may localize its situation and lipiodol injection will verify its position.

Artificial pneumothorax.—On occasion when it is difficult to determine whether a fairly massive lesion is neoplastic or inflammatory, an artificial pneumothorax will be of aid in reaching an exact diagnosis. This is often of importance in regard to prognosis and treatment. It is of little value if the neoplasm has not invaded the pulmonary tissue to some extent.

SECONDARY LESIONS

The secondary lesions may be classed into two groups, namely, *bronchial* and *metastatic*.

The bronchial lesions are practically all the result of obstruction leading to atelectasis and bronchiectasis. The recognition of these conditions is comparatively easy, but they frequently confuse the issue; many cases being diagnosed without regard to their primary cause. It may be stated that if either of these conditions is detected in a single lobe without a clear-cut history of a pulmonary inflammatory lesion then tumour must be suspected, especially in people over thirty years of age. Bronchiectatic cavities were present in 50 per cent of the cases here reported. When such a condition is present there is usually more or less continuous fever and leucocytosis. In some cases there may be chills and metastatic abscesses, which still further complicate the diagnosis. In a number of cases bronchiectasis may be present without infection. In such instances the cavities do not as a rule attain a large size, but the bronchi are dilated with thickened walls and peri-bronchial extension of the neoplasm.

The metastatic lesions are usually local in the first instance. From the parent growth the neoplastic process may extend along the bronchi, to infiltrate the lobe or lobes in a fan-shaped fashion, producing a massive pulmonary lesion. The earliest metastasis beyond the local site is to the peri-bronchial and mediastinal glands. These growths may give rise to local pressure signs which are confused with the bronchial symptoms proper. They differ in no way from mediastinal pressure due to other tumours. In the present series there has been paralysis of the recurrent laryngeal nerve, sympathetic paralysis, obliteration of the superior vena cava with œdema and cyanosis of the head and arms, stenosis of the trachea from without, dysphagia owing to pressure on the œsophagus, and root pains due to pressure. In addition, the neoplasm may invade both lungs via the mediastinal and peri-bronchial lymphatics and blood vessels, producing really a miliary pulmonary carcinomatosis, at times from a comparatively small bronchial tumour.

There are probably no tumours which give rise to such far-flung metastasis. It is to be expected that they should, on account of the frequency with which they invade the pulmonary vessels, growing in their walls and producing numerous neoplastic thromboses and emboli.

TABLE V.

No.	Parent Site	Site of Metastasis																												
		Mediastinal glands	Peri-bronchial glands	Cervical glands	Abdominal glands	Right lung	Right pleura	Left lung	Left pleura	Brain	Skull	Meninges	Thyroid	Pancreas	Adrenals	Ovaries	Sub-Cut. tissues	Muscles	Bones	Tracheal glands	Axillary glands	Liver	Heart	Pericardium	Spleen	Inguinal glands	Kidneys	Pituitary	Peritoneum	Prostate
1.	Right bronchus	1	1	1	1	1	1						1	1	1	1	1	1												
2.	Left bronchus	1	1							1																				
3.	Right bronchus	1	1		1	1	1	1	1								1		1	1	1	1								
4.	Right bronchus	1	1	1	1					1	1	1						1					1							
5.	Both bronchi at bifurcation	1	1	1		1	1	1	1					1					1					1	1	1	1			
6.	Right bronchus	1	1			1	1	1	1													1			1					1
7.	Left bronchus		1																											
8.	Right bronchus		1							1																				
9.	Right bronchus	1	1		1	1	1	1							1				1			1			1		1			
10.	At bifurcation																													
11.	Right bronchus	1	1	1		1	1	1	1	1	1	1	1		1							1						1		
12.	Right bronchus	1	1		1	1					1	1		1								1	1						1	
13.	Left bronchus	1	1	1	1			1		1																	1			
14.	Right bronchus	1	1		1	1	1	1							1		1					1							1	
15.	Left bronchus																													
16.	Right bronchus	1	1			1	1																							

It will be noted in the Table above that only two Cases (Nos. 6 and 15) had no discoverable metastases. Patient 6 died within six months of the onset from suffocation, as the tumour was situated at the bifurcation of the trachea and obstructed both main bronchi. Patient 15 died of empyema and pericarditis, with a *S. hæmolyticus* bacteriæmia following lobectomy. Two cases (Nos. 7 and 8) had metastases confined to the peribronchial glands. Both tumours were composed of columnar cells. In number 8 the tumour was situated in the second division of the right main bronchus, while in number 7 it was in the left upper bronchus. In both the history dated back over two and a half years and there was extensive bronchiectasis and abscess-formation. In the other cases the metastases were numerous and widely distributed. In patient 14 a metastasis was removed from the right eye-lid before the pulmonary symptoms had produced any pronounced disability, as the patient was a sufferer from chronic bronchitis and asthma.

DIAGNOSIS

The recognition of a bronchial tumour is a comparatively easy matter after it has become fully established and has invaded the surrounding structures. There are a number of traditional signs which are expected to be present before a diagnosis is usually entertained. These are hæmorrhage, fever, leucocytosis, and clinical signs of parenchymal pulmonary involvement. When these appear it is then usually too late for treatment except by palliative measures. Another time-consuming tradition is that chronic cough and dyspnœa are considered to be tuberculous until proved to the contrary. Furthermore, bronchiectasis should never be allowed to remain the final diagnosis unless a definite cause can be ascertained, particularly if it be confined to one lobe in an adult.

It is often stated that a bloody pleural fluid points strongly to a malignant growth. In this series pleural fluid was examined either during life or post mortem in ten cases. In eight of these it was non-hæmorrhagic. In the other two, it was clear during life and bloody at the autopsy, while in the other it was bloody during life and clear at the autopsy. Such findings do not at all support the tradition of hæmorrhagic effusion being strongly suggestive of pleural neoplasms. Such may be the case in primary

endothelioma of the pleura, but the point requires revision.

COURSE AND TERMINATION

The course was always to a fatal termination but some were much more prolonged than others. In 5 cases (Nos. 3, 4, 7, 8, and 15), the duration was over two years. Patients 3 and 4 died of asthenia, while 7, 8, and 15 died of pulmonary sepsis. Eleven died after an average duration of six months. Four patients (Nos. 1, 5, 6, and 10) died of suffocation, the average duration being five months. Two patients (Nos. 9 and 12) died of sepsis; 3 (Nos. 11, 14, and 16) of asthenia; and 2 (Nos. 2 and 13) of brain tumour.

TREATMENT

If cases can be recognized sufficiently early, that is, before the peri-bronchial or neighbouring glands are involved, modern pulmonary surgery holds out great expectations that lobectomy, single or multiple, may effect a complete cure. This is an expectation of the present which can only be attained when every effort is exerted to diagnose these cases during the stage of symptoms, without waiting for signs of extension to appear.

When the surrounding tissues are invaded the principal objective is the reduction of the size of the mediastinal mass, in order that suffocation may be delayed. This may be accomplished by deep x-ray or local radium therapy. At the best it is palliative. There is no evidence to indicate that it either prevents bronchiectasis and abscess formation or widespread dissemination of metastases.

Two cases out of our series are epitomized here. Case 1 is an average case; Case 2 is remarkable in that there were no pulmonary signs; clinically, attention was focussed on the cerebrum.

CASE 1

A housewife, aged 41. Onset with cough and dyspnœa in June, 1929. No sputum. Afebrile. In November, swelling of face, shoulders and upper extremities developed. Right cervical glands enlarged. X-ray on December 17th showed mediastinal widening. Death from suffocation on December 27, 1929.

Autopsy revealed cuboidal and polymorphic cell carcinoma of right bronchus, with metastases in cervical, abdominal, mediastinal, and peribronchial glands, the latter compressing the left bronchus; also in the right lung and pleura, thyroid, pancreas, adrenals, ovaries and abdominal wall.

CASE 2

An engineer, aged 45. Tiredness for six months, then onset in February, 1921, of loss of memory, mental confusion and vomiting. Appendectomy in March. Later, incontinence and gait difficulty. No pulmonary symptoms or signs. He was admitted June 3rd with papillœdema, strabismus, and white blood cell count of 18,000. Development of coma and other features of an expanding intracranial lesion, with death on June 15, 1921.

Autopsy disclosed a mass in the centre of the left upper lobe near the hilum, with apical scarring, cylindrical cell carcinoma of the left bronchus, with metastases in the brain and mediastinal glands.

A very comprehensive bibliography has been prepared for this article, which may be obtained from the senior author.—[ED.]

GRAFTING OF A PLACENTAL FRAGMENT IN THE CERVIX.—J. D. Parker reports a case in which a fragment of placental tissue measuring 3 by 5 cm. became grafted into a cervical laceration. It persisted for nearly a year, drawing its necessary blood supply from the cervix. The symptoms were vaginal bleeding and discharge, the hæmorrhage continuing for fourteen to eighteen days in each month, and causing loss of weight, dyspnœa, weakness, and palpitation of the heart. At first the cervical swelling was thought to be an angiomatous polyp, but the possibility of malignancy had to be considered. After removal, however, the histological examination revealed its placental nature, and also the fact that it was firmly attached in the cervical tear. Parker remarks that the logical explanation of the occurrence is that the fragment, in its passage from the uterus, was grasped in a lacerated and contracting cervix, and followed the usual course of skin grafts. Complete recovery ensued after its removal. He adds that he has been unable to find in the literature available any previous report of such an unusual condition.—*J. Am. M. Ass.*, 1932, **99**: 212.

THE AVERAGE "DYNAMIC" BLOOD PRESSURE, THE NEW CRITERION OF CARDIAC EFFICIENCY*

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WHEN the blood is projected into the circulatory tree by the systole of the heart it meets with a certain resistance which increases towards the periphery. As the calibre of the vessel diminishes along its course the blood wave distends the arteries, which, in turn, owing to their elasticity, retract on themselves and thus return to the column of blood the pressure they had originally received. The arterial tension stands, therefore, for the retracting force of the artery, while the pressure stands for the hydraulic load of the blood. These two expressions may be considered synonymous, because the retracting force of the arterial wall is proportionately the same as that of the blood wave which distends it. As the contractions of the heart succeed one another very rapidly the arteries are in a state of constant tension, which naturally varies in degree from one extreme to the other according to the phase of the cardiac cycle.

As soon as the possibility of measurement of the blood pressure in man was realized,[1] two important phases were appreciated; the *systolic*, synchronous with the systole of the heart, during which the pressure is the highest and corresponds to the maxima; and the *diastolic*, synchronous with the diastole of the heart, the lowest appreciable level, or the minima. In progressing from one extreme level to the other the pressure must pass through a series of successive values. There is no doubt but that the true pressure, the constant load in the artery, exists between these two levels, and assures at all times, under varied influences, the same irrigation throughout the whole body. This pressure is regulated by the vasomotor system, and probably by some other unknown mechanism.

Most authorities hold that the diastolic pressure is responsible for the coronary circulation, and, as has been enunciated by Paul White,[2] "If the diastolic pressure is abnormally low it means a serious handicap because of poor myocardial nutrition, since the coronary circulation is dependent on an adequate diastolic pressure." This, however, is doubtful when we consider those with aortic regurgitation (Corrigan type) who carry on an apparently normal existence even with a very low pressure. Their circulatory adaptation is so nearly normal that several authors are inclined to regard this affection as an infirmity rather than a disease. We shall point out later why this is so. The diastolic pressure, as well as the systolic, demonstrates but a very short interval of the cardiac revolution, but the true pressure, the constant load in the artery, is *another* element.

When we examine a blood pressure curve of an artery during a whole cardiac cycle, or a sphygmographic tracing (Fig. 1), which is its reflection,

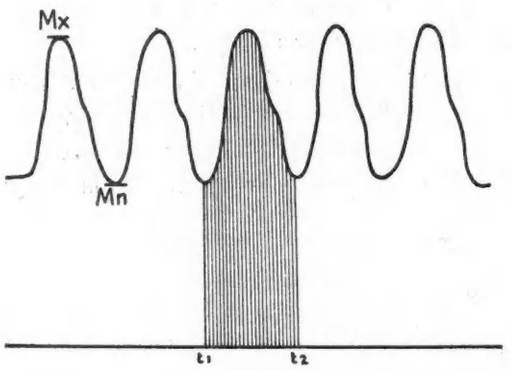

FIG. 1

we observe that during the cycle the arterial pressure undergoes various modifications. It goes through an infinity of successive values from the systolic to the diastolic level. These are the various pressure values which obtain in the artery at different intervals of the cycle. The average of all these values represents the constant load in the arteries throughout the body; it is the average "dynamic" pressure—the *constant* to which French authorities give the admirable definition of "régime depression". This assures the same flow of blood in the vessel, during a certain interval, that the régime of the variable pressures affords normally in the arterial system.

*Read before the Section of Medicine, Academy of Medicine, Toronto, April 12, 1932.

† Du Service de Cardiologie de M. le Professeur Henri Vaquez, Faculté de Médecine, Hôpital de la Pitié, Paris.

How are we to recognize it, and what clinical means are at our disposal to measure it? Potain,[3] some forty years ago, demonstrated the importance of the average pressure in estimating the work of the heart and the state of the myocardium. In a very ingenious way he tried to measure it with the apparatus at his disposal at that time, and by a method of calculation of proportions. He deserves much credit, for in spite of his laborious methods his figures closely approach those we get to-day. Pachon,[4] in 1920, was able to measure it on his "schema de circulation," with the help of Marey's compensatory manometer. Gley and Gomez[5] took up the question anew and made it possible for us to-day to use the oscillometer to measure the average dynamic pressure clinically, which formerly seemed almost an impossibility. It was called *average* dynamic pressure, to differentiate it from the *mean* pressure, which is $\frac{Mx + Mn}{2}$ = av. pressure (numerical).

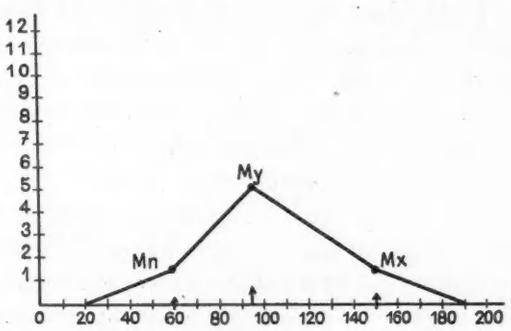

FIG. 2

The technique we have adopted and followed throughout is to read carefully on the oscillometric scale the amplitude of each oscillation at various counter pressures on the manometer and inscribe them, as in Fig. 2. For example, the amplitude of the oscillations at a counter pressure of 95 mm. of Hg. was of 5 divisions in Fig. 2, and therefore the maximal, which corresponds to the average pressure.

It must be borne in mind that strict attention should be given to certain details more or less familiar to all of us, otherwise the readings obtained will be incorrect:

1. The arm, leg, or whatever extremity is used, to which the cuff is applied, must be approximately at the same level as the base of the heart; for this it is always best that the individual should be in the recumbent position. If there is a difference in levels, the height of the intervening column of blood adds or subtracts from the true pressure, the arm being lower or higher than the heart, as the case may be.

2. The cuff should be carefully applied. It must not be too loose, otherwise more air has to be pumped into the bag to inflate it, thereby reducing the amplitude of the oscillations. It is best to read the oscillations by decompressing gradually from the supramaximal oscillations. We have observed that it is best not to compress and decompress at various pressures.

In spite of the above precaution we have met with persons in whom we get a plateau type of curve. Such are patients suffering from aortic regurgitation, with Adams-Stokes' syndrome with marked bradycardia, and hypertension cases with an extremely high systolic pressure. The average pressure in the above cases is at times very difficult to measure, because a series of oscillations have the same amplitude, and give a plateau type of tracing, as in Fig. 3. This is overcome in many instances by replacing the narrow cuff by a wider one. We have found

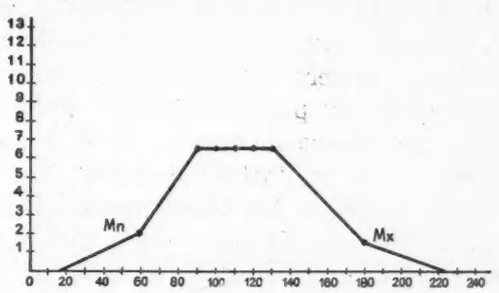

FIG. 3

that if we use a bag of 12 to 14 cm. in width, these plateau curves are rare. In cases of auricular fibrillation the estimation of the average pressure is quite difficult; the amplitude of the oscillation varies constantly, and the maximal one cannot be read with certainty.

From the study of over 200 normal persons we have found that the average pressure corresponded to 90-100 mm. of Hg. and was a physiological constant, in that it was not influenced by any physical condition, such as digestion, menstruation, physical exercise, etc. It is the same for both sexes. Whereas the two extreme pressures undergo a modification from various influences, as just stated, and also differ in the different parts of the body, being higher in the leg than in the arm, in the thigh than in the calf; the average dynamic pressure is the same through the whole body in the recumbent position. The only changes we observed were with age. In normal subjects from 10 to 25 years of age it is

80 to 90 mm. of Hg.; from 25 to 50 years it is 90 to 100; over 50 years it is 90 to 110. But when the average dynamic pressure is or over 110 it is always considered pathological.

The measurement of the blood pressure has been to date the only clinical means at our disposal of investigating the state of the myocardium and the cardiac efficiency. At first great enthusiasm was manifested in regard to the variations of the systolic pressure, but it was not long before they were proved non-pathognomonic of cardiac failure, as a large number of hypertensive cases carry on for a long time with a high pressure, without demonstrable evidence of decompensation, whereas on the other hand there are patients who are entirely decompensated with apparently normal pressures. The systolic variations were denounced in favour of the diastolic, but this also failed to add any new information.

Graupner,[6] in Germany, stimulated a new interest with the differential, or pulse, pressure. (Puldruck) (Mx – Mn) = P.D. (differential pressure). From his experiences Graupner drew certain conclusions, namely—"A moderate amount of work in strong persons produces, generally speaking, no change in systolic blood pressure after work, but a further increase in the work done results in the blood pressure standing higher immediately after work, then more or less quickly returning to normal. If the work done is still more increased we find a sinking of the blood pressure immediately after exercise. However, the blood pressure quickly arises above normal and then falls back to normal. As long as this secondary rise above normal is present, 'functional insufficiency' exists; the weaker the myocardium, the less the amount of work necessary to produce functional insufficiency. If primary myocardial weakness is present we speak of pathological insufficiency. This is characterized by primary sinking of the blood pressure below normal, gradually rising to normal."

Pachon,[7] after studying the modifications of the blood pressure as criteria for athletic training, arrived at somewhat different conclusions. According to him, in normal subjects moderate exercise tends either to increase the pressure or there is no variation from its initial figure, but in poorly trained athletes and in patients with signs of decompensation it tends to drop below the original figures, and thus increase the differential pressure. Martinet,[8] in 1916, in his turn upheld the view that there was an elevation of the systolic pressure varying from 20 to 30 mm. of Hg. after exercise, and of 10 mm. of Hg. of the diastolic in the normal subject. The reverse is true in the failing heart. All the above assertions were criticized by Vaquez and Donzelot,[9] Laubry and Lidy,[10] Rapport,[11] and many others, all of whom stressed emphatically the various influences which render the variations of the two extreme pressures undependable.

Since its introduction to the clinic by Professor Vaquez[12,13] and his school, the average pressure has stood the test of criticism and has rendered invaluable service. Its measurement alone indicates to us if we are dealing with an hypertensive individual, because the average pressure is always above normal limit in this group, and its elevation coincides with the severity of the affection. It has thrown a flood of light on cardiac enlargement of unknown origin, especially in the case of the left ventricular hypertrophy which has been in the past the subject of much discussion. Quoting again from White,[14] "It is possible that there exist causes of enlargement still unrecognized or poorly understood; therefore it is unwise as yet to label every large heart of unknown type as hypertensive, without more proof."

We believe we have to-day, as a result of our investigations on the average pressure, the proof —we will not say of *all* of the above, but certainly in the matter of left ventricular hypertrophy. We have encountered a large number of people, apparently in normal health, or with vague symptoms of hypertension, who had an average pressure above the normal limit without any elevation of the two extreme pressures. Their radioscopic examinations revealed either a hypertrophy of the left ventricle or some quantitative or qualitative changes in the aortic wall. The same was true with many patients showing the classical symptoms of hypertension, but who on examination failed to show any supernormal change of the extreme pressures. We have designated the above as the "concealed" hypertension group (*Hypertension Solitaire*).

Would it represent the initial stage of hypertension? Certainly the measurement of the average pressure permits us to-day to confirm our diagnosis before the extreme pressures have reached supernormal figures, or when the affection is in the advanced stages of its evolution.

A normal average dynamic pressure explains why a patient with aortic regurgitation (Corrigan

type) has so few symptoms, and is apparently well, in spite of a very low diastolic pressure. In such of our cases as were free from signs and symptoms of cardiac failure, we found the average pressure within the normal throughout the body, in the recumbent position. This was not true of the extreme pressures, as they varied from the arm to the leg, etc. It stands to reason that the circulation in the various organs of the body, as well as the coronary circulation, depends upon the average dynamic pressure, the true pressure representing the constant load in the arteries, and not upon the diastolic, which theory was upheld until recently.

The modifications of the *average* pressure following upon exercise compared with those of the *extreme* pressures were studied by Gomez and myself[15] in normal and hypertensive individuals and the observations were of great interest. In the normal subject (as shown by Fig. 4), the systolic pressure after moderate exercise went up 20 to 30 mm. of Hg. and came back to its original figure after two minutes. The diastolic pressure went through the same modification; the rise was not so great as the systolic, but the return to the normal figure took less time than in the former. The average pressure in every case remained stationary; it was not influenced by exercise.

Cases with hypertension were divided into two groups. In the first group are patients with confirmed hypertension without any clinical signs or symptoms of cardiac failure. In the second group were those with confirmed hypertension and with signs and symptoms of cardiac failure.

In the first group the observations were almost identical with the normal. The systolic pressure went up 20 to 40 mm. of Hg. and returned to its original state within three to four minutes. The average pressure, as in the normal, did not change, except in two cases who had a marked hypertrophy of the left ventricle. In these cases it went up 5 to 10 mm. of Hg., but returned to its original figure almost instantly (Fig. 5). From the above information, generally speaking, we can say that in hypertension, without signs or symptoms of cardiac failure, the arterial pressure follows proportionately the same variations as in the normal subject.

This is not true of the second group of cases, and the results obtained were quite different. These patients were not called upon to do such strenuous exercise as the former group, but the extra strain was sufficient to precipitate an attack of dyspnœa in a few. After the exercise the systolic pressure went up only 10 to 15 mm. of

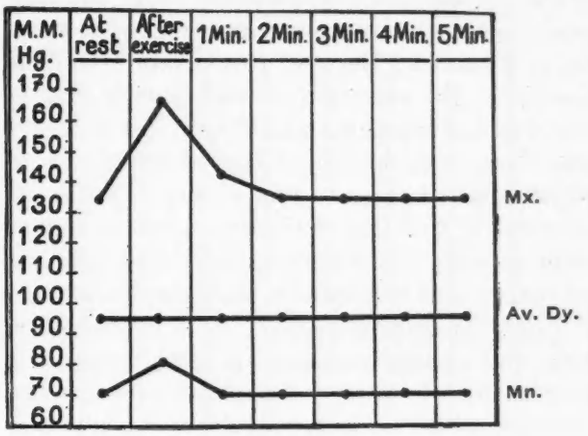

FIG. 4

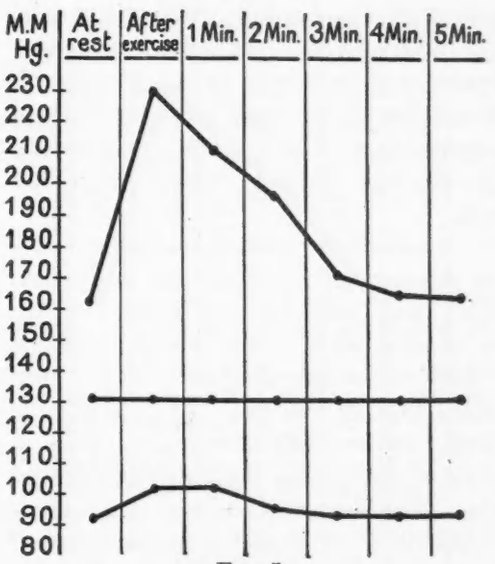

FIG. 5

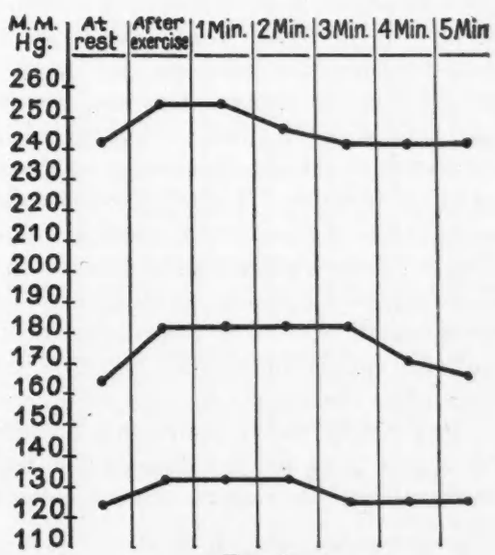

FIG. 6

Hg. and in two cases there were no changes. Never was it observed to fall below the original figure. The return to the initial figures took place in four to five minutes. The diastolic pressure went up in greater proportion, at times 20 to 25 mm. of Hg. and always more than the systolic. The elevation coincided with that of the average pressure, which went up in every case from 20 to 30 mm. of Hg., at times even to 40, and lasted three to four or five minutes (as seen in Fig. 6). Due to these pressure variations after exercise, the differential pressure diminished, as we had anticipated, whereas the average dynamic pressure increased. It is important to note that in every case the average pressure is proportionately closer to the systolic than to the diastolic, which is the reverse in the normal and in hypertension without cardiac failure.

From the foregoing observations it is apparent that in hypertension if the patient presents after moderate exercise slight or no change of the systolic pressure, with some modification of the average pressure, it should not be a *presumption*, but a *sure sign*, of some degree of cardiac deficiency.

We continued our researches along the same line in the various cardiopathies with Professor Vaquez[16] and came to the same conclusions. When dealing with a well compensated affection there is no modification of the average pressure following exercise. If there is evidence of cardiac failure, left ventricular or total, an elevation of the average pressure occurs following exercise. The degree of elevation and the time elapsed before it returns to its initial figure—that is the time necessary for the circulation to be adapted—coincides with the degree of decompensation. In the course of our studies we met with four cases which showed signs and symptoms of right-sided cardiac failure (dyspnœa, cyanosis, venous congestion of the liver, peripheral œdema, etc., marked right-sided cardiac dilatation demonstrated radioscopically). Following exercise there was no variation of the average pressure in these individuals. From a physiological viewpoint this should be expected because the above signs and symptoms are all referred to the venous and not to the arterial circulation, and left ventricle being compensated. The results of only four observations may not be sufficient evidence on which to form a new basis for the diagnosis of right-sided failure, but we believe that it deserves mention.

Our findings confirmed the theory that the average dynamic pressure is a physiological constant as already indicated by Professor Vaquez and his collaborators. In physics as well as in mathematics a constant is expressed by an equation, for example, the Co_2 tension of the blood, pH = 7.3 to 7.5. But as our functions multiply, vary, and are coordinated in their metabolic processes, due to physico-chemical processes (for example, temperature, basal metabolism, the acid-base equilibrium of the blood, etc.), these physiological constants are expressed by flexible equations, their normal values varying from one to the other extreme of their normal limits. When certain influences tend to modify their values within the normal boundaries the equilibrium is reestablished by the various regulators, *i.e.*, the heat centre, the buffers of the blood, etc. Discarding variations such as 5 to 10 mm. of Hg. the same is true of the average pressure.

An increase of the *average* pressure after exercise in a person who has a cardiac affection, but no objective or subjective symptoms of decompensation, is a premonitory sign of ensuing cardiac failure. One sees the importance of this sign, especially in giving a prognosis in the examination for life insurance, to eliminate a poor risk.

Since we are interested in the entire function of a cardiac cycle and the extreme pressures represent but a short interval of it, due to their variations under certain influences and errors of technique, they have failed to estimate the work of the heart. But due to the fact that the average pressure is a physiological constant, in other words is the reflection of the total régime of the variable pressures that reign in the arteries, it becomes quite evident that its measurement at rest and after exercise is a more exact criterion for the estimation of the efficiency of the heart and the state of the myocardium.

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GASTRO-INTESTINAL SYMPTOMS IN HYDRONEPHROSIS AND RENAL CALCULI*

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SURGICAL lesions of the kidney may present at times symptoms referable to other organs. This discussion is limited to cases of hydronephrosis and renal calculi producing symptoms suggestive of alimentary-tract disease, and is to demonstrate how these reflex symptoms occur through the nervous system. The type of case to be considered is that in which one kidney is involved by hydronephrosis or calculus and the other kidney is normal. These reflex symptoms usually fall under the following headings: (1) acute; (2) chronic; (a) gastric type, (b) colonic type.

The following 3 cases represent one of each group.

CASE 1

H. M. V., male, aged 38, married, a physician, was admitted to the University Hospital on March 2, 1930, complaining of pain in the left abdomen.

History of present illness.—For the previous six months he had noticed a feeling of fullness in the left side, the localization of which was indefinite. There had been a feeling of gaseous distension and an increasing tendency to constipation. Two days before admission there had been a sudden onset of left-sided pain of the colic type. He was nauseated, and vomited, and there was a marked desire for bowel movement. Following the passage of considerable gas there was marked, but not complete, relief. Since then he had had two similar but milder attacks. There was no history of hæmaturia, dysuria or frequency.

Personal history.—Septic nephritis, three years before; otherwise negative.

Family history.—Irrelevant.

Physical examination.—The tongue was slightly coated. The abdomen was moderately distended and tympanitic, moving freely with respiration. There was some slight tenderness over the whole left abdomen. No masses were palpated. Slight costovertebral tenderness was present on the left side. The kidneys were not palpated. There was no suprapubic tenderness. The external genitalia were normal. The prostate was normal in size, shape and consistency, not fixed, not nodular, not tender. The other systems were normal.

Laboratory findings.—The urine was clear, amber, acid, 1012, and contained no albumin or sugar; no pus, no blood, no casts. Non-protein nitrogen was 24 mgrm. per 100 c.c.; urea 14 mgrm. per 100 c.c.; creatinine 9 mgrm. per 100 c.c.; chlorides 450 mgrm. per 100 c.c. Hæmoglobin, 95 per cent; red blood cells 5,000,000; white blood cells 8,000. The Wassermann test was negative. Complete barium series were normal. A flat plate showed a shadow in the region of the left kidney, suggestive of a calculus.

Diary.—A complete urological study demonstrated a calculus, the size of a lima bean, in the left lower calyx; the left pelvis was otherwise normal. The calculus was removed by a combination pyelotomy and nephrotomy. The patient made an uninterrupted recovery and was discharged on the twentieth day.

In this case the patient, a physician, made a diagnosis himself of a partial acute obstruction of the large bowel. There was gaseous distension and a feeling of nausea. Passage of flatus gave relief. There were no urinary symptoms. After the calculus was removed the symptoms disappeared. The one physical sign suggestive of genito-urinary tract disease was costovertebral tenderness.

CASE 2

E. N., female, aged 39, a nurse, was admitted to the University Hospital on June 5, 1925, complaining of distress after eating.

History of present illness.—Four years previously she began to have periodic attacks of pain in the epigastrium after meals. This distress was relieved by alkalies. One year previously she had had a complete physical examination and a gastrointestinal barium series, with negative findings. Notwithstanding, in view of the suggestive history of peptic ulcer, she was placed on a modified Sippy diet with little or no relief. No history of frequency, dysuria, hæmaturia or cloudy urine.

Personal and family history.—Non-essential.

Physical examination.—The tongue was clean; teeth in good condition. The abdomen was symmetrical, not distended, and moved freely on respiration. Some tenderness on deep pressure in the epigastrium was noted. No masses were palpated. Slight costovertebral tenderness was detected on the left side. Kidneys not palpated; no tenderness along the course of the ureters; no suprapubic tenderness. The bladder was not distended. The other systems were negative.

Laboratory findings.—The urine was clear, amber, acid, 1014, and contained no albumin, sugar, pus, blood or casts. Non-protein nitrogen was 40 mgrm. per 100 c.c.; urea 14 mgrm. per 100 c.c.; creatinine 0.9 mgrm. per 100 c.c.; chlorides 400 mgrm. per 100 c.c. Hæmoglobin was 85 per cent; red blood cells 5,000,000; white blood cells 7,500. The Wassermann test was negative. Complete gastro-enterological examination, including test meal and a complete barium series, was negative X-ray showed a shadow in the region of the right kidney, suggestive of calculus.

Diary.—Complete urological study demonstrated a calculus, the size of a marble, in the middle right calyx. The kidney was otherwise normal. The calculus was removed by a combined pyelotomy and nephrotomy. The patient was discharged on the eighteenth day.

* Read at sixty-third annual meeting, Section of Urology, Canadian Medical Association, Toronto, June 22, 1932.

Here the symptoms were those of gastro-duodenal disease. On removal of the calculus the symptoms disappeared. The one physical sign suggestive of genito-urinary disease was costovertebral tenderness.

CASE 3

Q. L., a male, aged 47, married, was admitted to the University Hospital on November 11, 1931, complaining of constipation.

History of present illness.—For the past year he had noticed a gradually increasing tendency to constipation. For the past three months this has been very marked; the bowels only moved after drastic cathartics and repeated enemas. There had been a feeling of fullness and distress in the left abdomen. He had lost 25 lbs. in weight. His appetite was poor. There were no urinary symptoms.

Personal and family history.—Irrelevant.

Physical examination.—The tongue was coated, the abdomen moderately distended and symmetrical, moving freely on respiration. Slight diffuse tenderness was noted, more marked on the left side than on the right. No masses were palpated. Slight costovertebral tenderness was found on the left side; no costovertebral tenderness on the right. The kidneys were not palpated. There was no suprapubic tenderness. The external genitalia were normal. Rectal examination showed a prostate normal in size, shape and consistency, not fixed, not nodular, not tender.

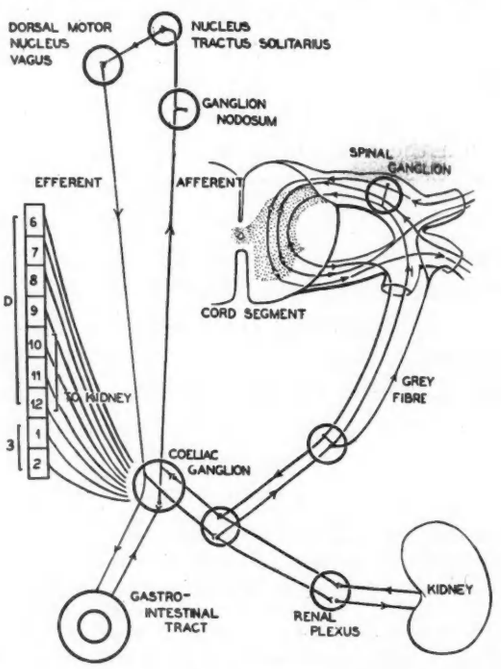
Laboratory findings.—The urine was clear, amber, acid, 1016, containing no albumin, no sugar, no pus, no blood, no casts. Examination of stool showed no blood or parasites. Hæmoglobin 80 per cent; red blood cells 4,200,000; white blood cells 7,000. Non-protein nitrogen (by new method) 25 mgrm. per 100 c.c.; urea 14 mgrm. per 100 c.c.; creatinine 1.2 mgrm. per 100 c.c.; chlorides 400 mgrm. per 100 c.c. The Wassermann test was negative. Gastric analysis was negative. A complete barium series revealed marked colonic stasis, but was otherwise negative.

Cystoscopic examination demonstrated a left hydronephrosis, grade iii. A left nephrectomy was done and the patient was discharged on the fourteenth day.

The history of rapidly increasing constipation was suggestive of a chronic obstruction. Costovertebral tenderness, left, led to a complete genito-urinary study. Following a nephrectomy the symptoms disappeared.

The innervation of the stomach, small intestine, cæcum, and transverse colon is (1) the vagus (parasympathetic) which is excito-motor; (2) sympathetic, which is inhibito-motor. For the balance of the intestine the excito-motor impulses occur through the sacral parasympathetic, and the inhibito-motor through the lumbar sympathetic. The initial effect of stimulation of the vagus is inhibition of intestinal movement, followed by an increase of intestinal motility. Stimulation of the sympathetic fibres is followed by a decrease in motility. The effect of either sympathetic or parasympathetic fibres on the sphincters is opposite to the effect on peristalsis.

The visceral nerves of the kidney, coming from the sixth to twelfth dorsal segments and the first and second lumbar segments, have direct reflex connection with those segments. In this way we may get cutaneous hyperæsthesia referred through the somatic branches of these segments, and also reflexes referred to the visceral branches of these segments which supply the gastro-intestinal tract. Similarly, impulses from the kidney, having reached the spinal cord, may pass upward in the tractus solitarius to the



nucleus of the vagus, there connecting with the parasympathetic fibres which are distributed to the stomach and upper abdomen, causing arrest of gastric and intestinal motility, followed by an increase in motility. In other words, the musculature of the stomach and duodenum is interfered with and may give rise to symptoms of "dyspepsia." By similar reflex connection through spinal cord cells (intermedio-lateral column cells), the sympathetic fibres supplying the large bowel (inhibito-motor) may be reflexly stimulated and constipation result.

COMMENTS

The above cases are presented as extreme examples of reflex involvement of the gastro-intestinal system from renal lesions of the mechanical type. In few cases is the symptomatology so misleading, but often a mixture of alimentary and urogenital symptoms occur and unless the urogenital history is taken care-

fully it is apt to be understated by the patient. A negative urine and a history predominantly of the gastro-intestinal type easily lead to errors in diagnosis. The more or less constant finding in these cases suggestive of renal disease is costovertebral tenderness. Other gastro-intestinal symptoms may also occur, such as diarrhœa and symptoms suggestive of appendicitis or biliary disease. In those cases in which the history is suggestive of alimentary-tract disease, if a complete gastro-enterological examination is negative, it should be remembered that a kidney lesion may be present, the diagnosis of which can only be made by a complete genito-urinary study.

I wish to thank Dr. A. W. Downs, Professor of Physiology and Dr. Evan Greene, Professor of Anatomy, University of Alberta, for their help in preparing this paper.

THE SIGNIFICANCE OF BACKACHE IN GENITO-URINARY DISEASE*

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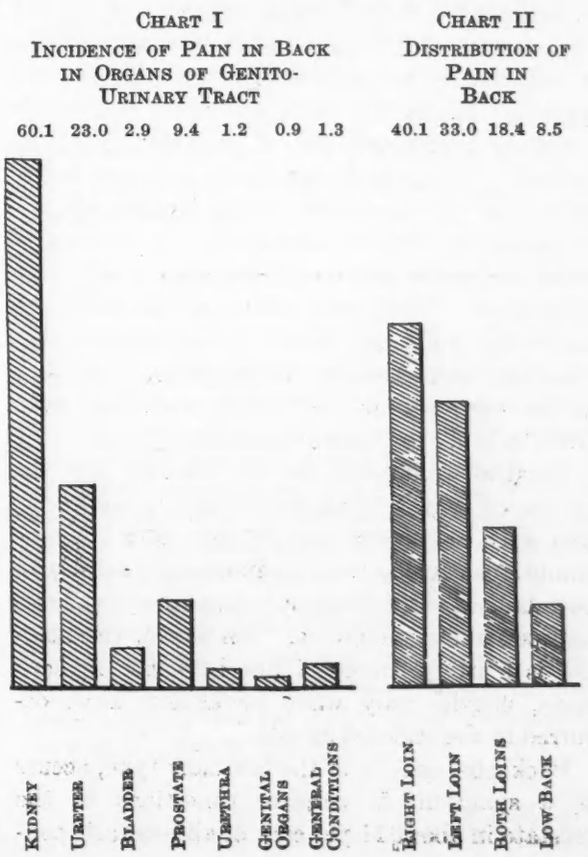
A RECENT investigation in our Department regarding the incidence and significance of hæmaturia occurring as a chief complaint by patients admitted for urological study has led to a similar research with regard to another important symptom, namely, backache, or, more definitely, pain in the loin.

In our series pain in the loin has varied from an ache in the back, or mere consciousness of the affected side, to the sharp, lancinating, excruciating agony of renal or ureteral colic. While renal and ureteral colic due to stone form a very appreciable percentage of our series, our interest has been directed to the backache or pain in the loin in those conditions in which the picture painted by the character of the pain is less clear-cut. How frequently do we have complaints of pain or ache in the back, in one loin, across the back, or even low down over the sacral region, usually without radiation and often quite indefinite!

Pain in the back was complained of 3,269 times in 11,120 admissions, or in 29.29 per cent. The right side alone was complained of in 40.1 per cent; the left alone in 33.0 per cent; both sides in 18.4 per cent, and low back pain in 8.5 per cent.

Surgical conditions of the kidney are responsible for the complaint of loin pain in 61.3 per cent of the cases under review. Hydronephrosis, infected and non-infected, ptosis of the kidney, frequently with an associated hydronephrotic condition of the renal pelvis and ureter, pyelitis, acute or chronic, and pyonephrosis, in short, those lesions of the kidney and ureter in which interference with the proper drainage of the upper urinary tract is the basis of their pathology are the causes of backache in almost 40 per cent of all cases complaining of this symptom.

It is interesting to note that backache of a mild degree, sometimes unilateral, not infrequently bilateral, and again low in the back, was perhaps the only complaint in an unsuspected hydronephrosis or an unrecognized ptosis of the



*Read at the sixty-third annual meeting, Canadian Medical Association, Section of Urology, Toronto, June 22, 1932.

kidney. Fully one-quarter of all our series of loin pain have been found to be due to hydronephrosis and ptosis, and such occurred predominantly in female patients (66.5 per cent). Pain in these conditions was complained of in the right loin in 48.7 per cent; in the left in 21.6 per cent; bilateral in 24.0 per cent; and low back pain in 5.7 per cent.

Indeed, as shown in Chart II, the right side throughout our series has been the most frequent offender. This is unquestionably due to the now well-recognized fact of the greater degree of mobility of the right kidney, and the consequent greater liability to derangement of drainage on that side. It is of interest to note that in those conditions occurring most frequently in females, namely, pyelitis, pyonephrosis, hydronephrosis and nephroptosis, the right side was involved in 820 of 1,455 cases, or 56.3 per cent, whereas in those conditions predominating in the male, as in rupture of the kidney, acute pyelonephritis, perinephritic abscess, renal tuberculosis, renal and ureteral calculi, the incidence of involvement of the right side was 700 times in 1,437 cases or 43.7 per cent. It seems evident that females are more liable than males to pain in the back on the right side because of an assumed greater mobility of the right kidney, suggesting obstructive lesions in the kidney and ureter.

Urinary calculus—renal or ureteral— is the disease entity giving the greatest number with pain in the back. The pain here, unlike the dragging numbing ache of chronic renal and ureteral stasis, is characteristic and not easily mistaken. It is sudden, sharp, lancinating, excruciating and often nauseating. It is due to muscular spasm and sometimes goes as suddenly as it came. Males predominate in this affliction, especially in ureteral stone. It is suggested that this may be so because of the greater possibility of the occurrence of obstructive conditions, even when mild, in the male genito-urinary tract.

Surgical conditions of the bladder are the source of only a small percentage of backache, and such is mostly low in the back. Those conditions causing such symptoms are mostly to be found in the female sex—trigonitis, cystocele and perivesical adhesions. Tumour of the bladder is a likely source of low backache in both sexes, usually only when metastases have occurred in the regional glands.

Backache, usually of the low-back type, occurs as a symptom in surgical conditions of the prostate in about 11 per cent of all prostatic con-

TABLE OF GENITO-URINARY CONDITIONS ASSOCIATED WITH PAIN IN THE BACK

CLINICAL DIAGNOSIS:	*Number complaining of pain in back*	*Number of Admissions*	*Percentage complaining of pain in back*
Kidney:			
Rupture of kidney	36	46	78.2
Acute pyelo-nephritis	68	119	57.1
Perinephritic abscess	64	64	100.0
Pyelitis	376	937	40.1
Renal tuberculosis	108	338	31.9
Chronic nephritis	20	131	15.2
Hydronephrosis	420	562	74.7
Pyonephrosis	100	296	33.9
Renal calculus	288	541	53.2
Tumour of kidney	64	98	65.3
Nephrotosis	176	327	53.8
Nephrotosis with hydronephrosis	216	432	50.0
Solitary kidney	32	36	84.4
Double renal pelvis and ureter	12	28	42.9
Congenital polycystic kidney	12	33	36.3
Congenital hypoplastic kidney	12	15	80.0
Ureter:			
Ureteral calculus	724	773	92.3
Stricture of ureter	28	44	63.6
Bladder:			
Trigonitis	24	94	25.6
Cystocele	16	134	11.9
Diverticulum	8	210	4.8
Perivesical adhesions	4	20	20.0
Tumour	36	407	8.8
Vesico-vaginal fistula	8	34	23.5
Prostate:			
Prostatitis	128	317	40.3
Prostatic abscess	8	146	5.4
Tuberculosis	8	64	14 0
Prostatic calculi	16	35	45.7
Contracted vesical neck	12	45	26.6
Prostatism	92	1638	5.6
Carcinoma	36	259	13.9
Urethra:			
Stricture	32	376	8.5
Urethral calculus (impacted)	8	18	66.6
Genital organs:			
Hydrocele	12	220	5.0
Carcinoma testicle with abdominal metastases	8	20	40.0
Tuberculosis of epididymis	8	100	8.0
Seminal vesiculitis	4	65	6.1
General:			
Carcinoma cervicis uteri	12	15	80.0
Chronic pelvic inflammation	16	21	76.1
Cholelithiasis	16	24	66.6
Diabetes insipidus	1	8	12.5

In 11,125 admissions 3,265 patients complained of pain in the back—29.29 per cent.

ditions. Prostatitis, either acute or chronic, is the most frequent cause, while prostatism and carcinoma of the prostate are somewhat less frequent sources.

Of genital involvements giving pain in the back, hydrocele of the tunica vaginalis is the most frequent offender. It is very likely due to the weight of the enlarged and distended hydrocele sac dragging on the spermatic cord, and producing the low back ache.

DISCUSSION

Sudden, more or less acute pain in the loin following trauma and accompanied by blood in the urine suggests rupture of the kidney. Dull aching pain in one or both loins with some fever, and pus, blood and casts in the urine raises suspicions of acute pyelonephritis. Intermittent dull aching pain in the loin, with a low septic temperature and a history of recent or remote pyogenic infection, makes one keep in mind perinephritic abscess. Pain in the loin, at first dull, and aching, later becoming more constant and severe, accompanied by chill, high febrile reaction, pyuria and bacilluria, particularly if the patient is a female and in addition is pregnant, makes acute colon bacillus pyelitis a likely consideration. Pain in the loin in tuberculosis of the kidney is a late finding, probably due to an involvement of the perinephritic tissues.

Dull aching pain in one or both loins, or low down across the back, perhaps getting worse towards the close of the day, and occurring frequently without pathological findings in the urine, may be due to hydronephrosis or to ptosis of the kidney. If there is pyuria the hydronephrosis may be associated with infection, or if there is much pyuria and long history of low grade loin pain, pyonephrosis is to be considered. Sudden, acute , severe, stabbing pain in the loin, perhaps with radiation to the genitals, the groin or the thigh, with blood in the urine, either macroscopic or microscopic, means renal or ureteral colic due to stone. Pain in the loin, usually not severe, along with a painless hæmaturia, and perhaps accompanied by a palpable mass in the affected side, should bring to mind tumour of the kidney. Pain in both loins, sometimes with an acute exacerbation on one side, with enlarged, easily palpated kidneys, and accompanied by the findings of chronic nephritis, suggests congenital polycystic kidney. Low back pain with radiation along the backs of the thighs in the male brings to mind the possibility of malignancy of the bladder or prostate, with metastasis to the regional lymph nodes. Low back pain in young male adults suggests the existence of prostatitis, either acute or chronic, or is the accompaniment of hydrocele of the tunica vaginalis or varicocele.

CONCLUSIONS

1. That backache or pain in the loin is a frequent and important symptom in genito-urinary disease.

2. That surgical conditions of the kidney are the source of most pain in the loin.

3. That renal and ureteral calculi are the single disease entities most often the cause of loin pain.

4. That backache, often of indefinite character, is of common occurrence in hydronephrosis and ptosis of the kidney.

POTASSIUM PERMANGANATE IN SUPPRESSION OF URINE.—Dr. Robert Napier (Aden) writes: A short time ago I admitted a boy of 12 suffering from a septic pustular rash on the face and having albumin in the urine. For a few days the temperature remained normal and albumin was abundant, but the amount of urine passed, despite all measures taken, rapidly diminished, until it reached 11, 12, and 5 ounces on each of three successive days. By this time there was considerable œdema, and the child appeared to be dying. I decided to try the effect of a hypodermic injection of potassium permanganate (as outlined in the *Extra Pharmacopœia*), and gave ½ c.c. of ½ per cent solution. The urine output rose again to 12 ounces, and next day an injection of 1 c.c. of ½ per cent solution was given, and a satisfactory increase followed (17 ounces). On the third day no injection was given, and the output diminished to such an extent that on the day following I gave 1½ c.c. of ½ per cent solution. From the time of the last injection, ten days ago, the urinary output has risen rapidly to 40 ounces, and has remained at that level, while the general symptoms and signs are clearing. Though the immediate effects of potassium permanganate in such a case appear to justify its administration, the obvious objection is not only that the injections are painful at the time—quite severely so— but that the tissues tend to break down and slough at the site.—Letter in *Brit. M. J.*, 1932, **2**: 996.

TUBERCULOSIS IN CHILDREN*

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IN dealing with the problems of recognizing tuberculosis in young children we have to consider first the subjective symptoms of the child, and, secondly, the physical manifestations of disease, whenever and however they are recognizable; we must for the moment forget the criteria of tuberculosis which we have learnt to associate with adults. It is important to recognize at the outset that tuberculosis in children is different, both in its manifestations and in its behaviour, from the same condition in adults. For this reason we speak of the *infantile*, *juvenile* and *adult* types of tuberculosis.

We all know that tuberculosis in very young infants is usually a rapidly fatal disease, however mild its early manifestations may be. In fact, even without manifestations of any kind, we have been taught to believe, and I think in a large measure it is still true, that the mere presence of a positive tuberculin reaction in an infant is of absolutely bad prognostic significance. This is because tuberculosis in young infants does not usually remain a local condition, but very rapidly becomes generalized. In such instances we see anorexia and rapid loss of weight, intestinal disturbances, and enlarged spleen as the main features of rapidly progressing tuberculosis in a young infant. There may or may not be cough, but there may however be the tell-tale papulo-necrotic tuberculide, visible somewhere on the skin, which will establish the diagnosis. Here, too, of course, a history of contact can almost always be elicited. The disease progresses very rapidly, and death ensues apparently from marasmus, long before signs of meningeal involvement have had the opportunity of presenting themselves. In an older and better nourished infant, where there has been contact with tuberculosis, frequently our first manifestations may be the unmistakable signs of tuberculous meningitis. Often no other warning may be given to us but that the previously healthy infant becomes drowsy, has moderate fever, perhaps vomits, and in the course of a few days lapses into the condition of meningitis which is familiar to all of us. It is rather rare to find localization or the development of resistance in either young or older infants.

After the second year of life, however, these manifestations of resistance to the tuberculous infection begin to show themselves. Localization is far more common, and diagnosis from physical signs alone becomes more and more difficult. In the juvenile type of tuberculosis we begin to approach that form of infection and its consequences which usually leads to the development of immunity against the disease. We must realize that immunity to tuberculosis can only be attained through a mild infection with the disease; that the infection may be sub-clinical, and may never manifest any physical or roentgenological signs, or the child may pass through a period of moderate weight-loss, anorexia, and very slight temperature elevation, lasting for a period of three to six months, and followed by a return to normal health. It is to this phase of tuberculosis in children that we should devote our greatest attention. In the infantile type we have rather to deal with problems of prophylaxis, because once the condition is recognized very little indeed can be done. However, in the juvenile type recognition is of paramount importance, because of the benefits to be attained through rest and hygienic treatment.

I would say that of all the aids to diagnosis at present in our possession the properly applied and interpreted tuberculin test must be given a place of prime importance. It is, indeed, taken with the history, often the only suggestion of tuberculous infection that we may have. It is not at all uncommon to find a completely negative x-ray picture, a completely negative physical examination, no more than a slight elevation of temperature and a

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Read at the Sixty-third Annual Meeting of the Canadian Medical Association, Section of Pædiatrics, Toronto, June 22, 1932.

history of loss of weight, loss of appetite and fatigue. Added to such findings, a positive tuberculin test fairly accurately tells the story and indicates the course of treatment. A good percentage of cases of early tuberculosis in children will be found to be of this type. Stethoscopic examination will reveal nothing; the x-ray report, depending upon the personal equation of the roentgenologist, will say either the chest is normal or that there is a moderate increase in root shadows, but certainly nothing more than this. It has been shown that children with such symptoms and with positive tuberculin tests, despite their negative physical findings, can actually have open lesions and tubercle bacilli can be demonstrated in their stomach washings. This indicates the importance of isolating children of this type.

There are many instances, of course, where the roentgenogram, aided by a positive tuberculin test, is sufficiently diagnostic. I should venture to say that in the earliest forms of tuberculous infection the roentgenogram will be of little or no aid, because the primary infection may be somewhere in the periphery of the lung, about which the area of infiltration is of insufficient size or density to cast a shadow. As time progresses, the peribronchial and peritracheal glands draining the area of primary infection become secondarily involved, and, again, as has already many times been shown, may or may not give roentgenological evidence of disease. Abnormal hilar changes may only be visible by x-ray if the gland is calcified or if the surrounding alveolar tissue is atelectatic. It is easier to be certain of healed tuberculous infection from the roentgenogram alone than of active tuberculous infection, for in healed tuberculous infection calcified nodes, either about the gland or in the region of the primary focus, or both, may frequently be seen, and such calcification may be taken as *prima facie* evidence of the fact that the tuberculous bacillus has passed that way. Mere hilar changes in lungs, however, without calcification must not be interpreted as tuberculous without the aid of the tuberculin test, for similar changes may be found after whooping-cough, measles, pneumonia, and influenza, and one often sees instances in which the only differential aid is the presence or absence of a tuberculin reaction.

It must be remembered that a positive tuberculin reaction signifies only sensitization to the tuberculous toxin. It does not tell whether a lesion is active or not. A child with a well healed and well calcified tuberculous node will give a tuberculin reaction quite as strongly positive as that found in one in the incipient stage of tuberculous infection. The interpretation, therefore, of a tuberculin reaction must depend upon the composite picture of all of the available features, the x-ray evidence, the history, the physical examination.

Something should be said of the manifestations of tuberculous infection in children on the body surfaces, for here very often the exact clue to diagnosis can be obtained. Simplest of all is the tuberculous cervical adenitis, with or without cold abscess formation. Often such glands may heal and calcify, and calcification may be demonstrated by x-ray. Phlyctenular keratitis is another positive indication of tuberculous infection, and I will say this with positiveness and with all due respect to ophthalmologists who may think otherwise. I cannot, in my experience, recall a single instance in which a child with a phlyctenular keratitis had a negative tuberculin reaction. The malar bone is often the site of tuberculous disease. Here a tuberculous osteitis may produce a cold abscess and a discharging sinus, which in course of time heals with a considerable scar and ectropion. To tread on more controversial ground, erythema nodosum, I think, must now be regarded as an indication of infection with tuberculosis. Anyone familiar with an intradermal tuberculin reaction will at once recognize a similarity in appearance between a tuberculin skin reaction and an individual erythema node. Wallgren and others have recently shown that a large percentage of children with erythema nodosum have tubercle bacilli in their stomach washings. Another skin manifestation which is absolutely diagnostic of tuberculosis is the papulo-necrotic tuberculide. This lesion is absolutely characteristic, and to the trained eye unmistakable. It is a miliary tubercle of the skin, and results from tubercle bacilli that have gained access to the general circulation and have come to rest in the skin arterioles.

The point that I wish to emphasize is that in all these lesions of the skin we must not be satisfied with the diagnosis of local tubercu-

losis, but must search for tuberculosis elsewhere, and particularly in the lungs. One can recall very few instances of any one of these superficial conditions just mentioned, in which at the same time significant lesions were not found in the chest. Of all the forms mentioned the commonest will be erythema nodosum and phlyctenular keratitis. When these are recognized a roentgenogram of the chest must invariably be made, and invariably will lesions be found. It does not do, therefore, to dismiss the child who has erythema nodosum with a prescription for three or four weeks' rest in bed, or the child who has phlyctenular keratitis with treatment of the eye alone until the ulcer has healed. These children, as well as any others with superficial manifestations of tuberculosis, must be treated with the same consideration as any child showing primary tuberculosis elsewhere.

Within the past ten years the attention of pædiatricians has been directed to an extremely interesting pulmonary condition in children with tuberculous infection, to which the name of epituberculosis has been given. Epituberculosis is supposed to be a non-specific infiltration of the lung tissue surrounding a tuberculous area, either in the lung itself or in a peribronchial gland. In this condition the general state of the patient does not seem to harmonize with the pulmonary findings. One may find in a child in fair physical condition massive dullness involving an entire lobe, usually the right upper, with blowing breathing and few or no râles. The temperature may be normal, or only slightly elevated. Cough may be slight or absent, and there is no expectoration. Tubercle bacilli are not demonstrable in the sputum or stomach washings. Resolution takes place very slowly over the course of many months, with eventual healing, except that the hilar shadows on the affected side will show some residual calcification. Findings of this type, taken together with a positive tuberculin test, might lead one at first sight to a diagnosis of caseous pneumonia, but the subsequent course soon demonstrates the error of such a diagnosis. Children suffering from epituberculosis practically all recover, and post-mortems have been so rare in this condition that exact knowledge of the pathological nature of the lesion is still wanting, and the controversy still continues whether the lesion itself is specific or non-specific. Whatever the pathology, it is well for us to realize that epituberculosis is a benign condition, which invariably leads to resolution, and that in such cases we must guard against giving an unfavourable prognosis.

In the prophylaxis of tuberculosis our principal attention should be directed to the avoidance of contact wherever and whenever possible. Active immunization against tuberculosis is still very far from an accomplished fact; the question of the efficiency of BCG is still entirely controversial, and in no way definite. From what we know the method is not without danger. According to A. S. Griffith, the use of BCG in monkeys failed to show any appreciable difference in the resistance of these animals to tuberculous infection. The recent work of Schick on the intradermal use of BCG is perhaps a little more encouraging, and the method is assuredly less fraught with risk. It remains an open question, however, how much immunity can be obtained through the production of small cutaneous lesions, and this calls, of course, for the development of some quantitative method for the measurement of resistance to tuberculosis. Until we have more knowledge along these lines, we must rigorously separate infectious individuals from uninfected children. All known contacts should be subjected to all the diagnostic methods at our command, and those with positive findings immediately isolated, observed and treated. The late Doctor Holt used to say that two types of individual were the most common sources of danger in tuberculosis, the one who thinks he is cured, and the one who does not know he has it. It is not likely that a young adult with active tuberculosis would go long undiagnosed, but in my experience as a pædiatrist one of the commonest sources of danger to young children is the old person with a chronic cough, whom none suspects of having tuberculosis. These old people may be moderately comfortable, may even live to a ripe old age, and may spread tubercle bacilli wherever they go.

The treatment of tuberculosis in children is in no way different from the treatment of tuberculosis in adults. The principles of rest and fresh air, diet, and so forth, are identical at all ages. I do not think that it is necessary

to send these children away. With proper precautions they may be treated at home, and, in the ordinary glandular cases, quite successfully. The period of rest in bed will depend entirely upon the weight and temperature curves, and upon the indications of progress, as shown by the roentgenogram.

These few remarks are not to be considered as an attempt to cover the subject of tuberculosis in children. At most, they represent an effort, however poor, to make a few observations on the matter. I have tried to emphasize the general malignity of tuberculosis in very young infants, the tendency to generalization of the infective process, and the usually unfavourable prognosis, as opposed to the general benignity of the ordinary glandular type of tuberculosis in older children, the tendency to localization, and the development of a fairly good resistance, which usually is permanent, unless broken down by some accident such as a sudden erosion of a blood vessel, or some disease such as measles, whooping cough or influenza which tends to break down whatever resistance has been developed. In epituberculosis we have a comparatively newly recognized syndrome with which we must become familiar, and must realize that both its course and prognosis are by no means unfavourable.

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COMPLEMENT FIXATION IN GONORRHŒAL ARTHRITIS*

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IN a previous paper[4] I gave the results obtained with the complement fixation reaction by using antigens prepared from various strains of streptococci and from the gonococcus, and found that by this method, the *S. viridans* and, in a good many cases, the gonococcus seemed to play an important part in the etiology of arthritis. As there is already sufficient clinical and bacteriological evidence that a large number of cases of arthritis, in its various manifestations, are caused by gonorrhœa, I wish to give the results of my experience with this serological method.

From the clinical standpoint, Osler, who characterizes gonorrhœal arthritis as "the most damaging, disabling and serious of all complications of gonorrhœa," states that this condition occurs in from 2 to 5 per cent of the cases. Mayr and Bremer, in a statistical study of the cases of arthritis in their clinic during 10 years, reported 5,778 cases of gonorrhœa of which 2.3 per cent were males and 2 per cent females suffering from joint complications. Of these, 45.2 per cent were monoarticular and 28.2 per cent polyarticular, while in 26.6 per cent the arthritis was first polyarticular and later monoarticular. Thomas quotes Surgeon-General Ireland, to the effect that the incidence of arthritis in 259,899 admissions for gonorrhœa was 3.03 per cent. This author believes that "many cases of arthritis developing months or years after the acute gonorrhœa will be found to have at least a mixed or superimposed pyogenic focus of infection in the seminal vesicles, prostate, or tubes." Harrison found that of 2,500 cases of gonorrhœa which he examined, between 1 and 2 per cent had arthritis with tenosynovitis and bursitis. Lumb, in 50,000 cases of gonorrhœa, found 0.5 per cent had suffered from arthritis.

The uncertainty of a clinical diagnosis, together with the difficulty of obtaining and cultivating the gonococcus directly from the joints, has drawn many investigators to the serological method of the complement fixation test. This very important biological reaction for gonorrhœa was introduced in the laboratory in 1906 by Müller and Oppenheim, who were the first to reveal by its means the presence of specific antibodies in the blood serum of patients suffering with gonorrhœal arthritis. Since its introduction, this test has been the subject of a series of investigations by Brück, Vannod, Wollstein, Teague and Torrey,

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Watabiki, Meakins, Schwartz and McNeil, Thompson, Harrison, Osmond, Ower, Priestley, Martland, Tulloch and numerous others, all of whom have agreed as to its indisputable specificity and practical clinical importance. In general, these authors agree that its diagnostic value is at least as great as that of the Wassermann reaction in syphilis.

Schwartz says that a positive reaction is obtained in a certain number of cases of gonorrhœa where the bacteriological examination fails. McNeil believes that the technique of a complement fixation test is simpler than that of isolation of the gonococcus in culture, and the possibilities of error are less. These authors agree that the technique of isolating the gonococcus in culture is far more difficult than the technique of a complement fixation test. Torrey, Wilson and Bucknell, in a comparative study with smears, cultures and complement fixation test as a means of diagnosis of chronic gonorrhœa in women, conclude that the complement fixation test is the most reliable of the three. Barringer and Von Bose find that the complement fixation test for gonorrhœa is the surest means of estimating when a cure has been effected, and that we are justified in keeping the patient under treatment as long as this test remains positive. Thompson admits that the complement deviation test in gonorrhœa is destined to be of great importance, as it is extremely difficult to determine, by clinical and microscopic methods, when a patient is definitely cured of this disease, and this is especially true in the case of women.

In their official publication, the Medical Research Committee of Great Britain states that, while it cannot replace other methods of diagnosis, the complement fixation test may, in certain cases, be the only laboratory means by which a gonococcal infection may be diagnosed. It is most likely, according to them, to be of value in cases of metastatic infection, where a direct demonstration of the gonococcus may be difficult if not impossible, and it is in these that the highest proportion of positive results is obtained.

The time of the appearance of the antibodies in the blood would be the same as that for syphilis, *i.e.*, three or four weeks. This has been confirmed by Thomas and Ivy who say that antibodies do not accumulate in the blood in sufficient amount to bring about a positive reaction until this time. Schwartz and McNeil say that in men a positive reaction is not obtained if the disease is limited to the anterior urethra, and in women, unless there is at least some involvement of the cervix. However, in the first three or four weeks of infection, a negative test would not exclude a gonococcus infection for, according to Schwartz, while a positive reaction denotes the presence or a recent activity in the body of a focus of living gonococcus, a negative reaction does not exclude the possibility of a gonorrhœal infection being present. This same author and McNeil observe that a positive reaction obtained seven or eight weeks after clinical cure warrants the belief that a patient should be regarded as still harboring gonococci.

As to the influence of the specific vaccine therapy on the reaction opinions vary. According to the Medical Research Committee, where gonorrhœal vaccines are employed as a cure, the complement fixation test is inadmissible, as the blood serum of patients thus treated may continue to give the reaction for four months." Henck and Lochbrunner are of the same opinion, but according to McNeil's observations, in persons whose blood contains no gonococcic antibodies, it is impossible to produce antibodies by injections of gonorrhœal vaccines. In conclusion, one may say that the specificity of this test has been recognized by all investigators in this field. Osmond and Oliver admit that this test for gonorrhœal infection appears to have been practised comparatively little, a neglect which is undeserved and probably due to the fact that "its value as equal to that of the Wassermann reaction has not been recognized." They assert that the "very low percentage (0.6 per cent) of false positive results appears to show that the test is remarkably specific."

TECHNIQUE

The technique adopted in the performance of this test may be one of the four suggested by the Medical Research Committee, *i.e.*, (1) Schwartz and McNeil's, (2) Ower's, (3) Kolmer's, and (4) Thompson's, the details of which are similar to those in the complement fixation test for syphilis.

PREPARATION OF THE ANTIGEN

Müller and Oppenheim used a suspension of gonococci in sodium chloride solution and the same method was adopted also by Brück, Wollstein and others. These investigators prepared their antigen from a single strain of gonococcus, and their test, although satisfactory in most cases, failed in others. This fact led to a special study by Teague and Torrey, who proved that the negative results obtained in cases of chronic gonorrhœa were due to the presence of different strains of gonococci. These authors, in a series of experiments on rabbits, showed that if a rabbit were immunized with a certain strain of gonococcus, the serum of this rabbit so immunized would react only with this special strain, but not with another. By repeated experiments they definitely proved that several strains of gonococci existed, fourteen or more, and that, consequently, for the preparation of a reliable antigen, this important factor should be the first requisite. The views of these authors were confirmed soon after by Watabiki, who found that the antigen so prepared was specific only for gonorrhœa, giving negative results with the serum of patients suffering from other conditions such as typhoid fever, pleurisy and meningitis. These findings were also confirmed by Wollstein and Schwartz and McNeil, who tested the antigen against the serum of rabbits immunized against dysentery, diphtheria, streptococci and staphylococci.

The most varied media have been used for the growth of the gonococcus and naturally each author claims the superiority of his own. The important issue is to obtain as good a growth as possible and to be able to repeat this with fourteen or more different strains of gonococcus.

The preparation of such an antigen, owing to the uncertainty of its adaptability either for its anticomplementary properties or other causes, places great responsibility on the pathologist, with a proportionate loss of time. The fact that the preparation of gonococcus antigen is practically an impossibility for the pathologist, owing to the difficulty of isolating this organism and the constant care required in subculturing and keeping a large number of strains alive, was already noted by Kolmer. According to him, "until simpler methods are devised, this antigen is best prepared in large central laboratories, where the cultures are handled and preserved by especially trained persons."

The antigens mostly used at present are suspensions of killed gonococci in sodium chloride solution, with the addition of a preservative (lysol, carbolic acid, etc.). The one used by Thompson, and claimed to be less anticomplementary, contains 100 million gonococci per c.c. dissolved in alkali and then neutralized. Tulloch used an antigen containing 500 million per c.c. Henck and Lochbrunner used Gonargin Höechst which is a vaccine containing 5,000 million cocci per c.c. These authors obtained a good antigen from this vaccine and not anticomplementary by centrifuging the germs off and using the supernatant fluid diluted 1 in 5 with NaCl. Kunewälder uses a polyvalent vaccine put on the market by Kahlbaum-Schering and containing about 2,000 cocci per c.c. The one which I used is prepared by Parke, Davis & Co., and contains all the 14 strains described and isolated by Torrey.

According to the Medical Research Committee, "It would be an advantage if in addition the polyvalent gonorrhœal antigen supplied by one or other firm were issued under government control, *i.e.*, that each batch of such antigen be tested officially and issued with date of preparation, serial number, and a certificate that it has passed the official test."

THE AMOUNT OF ANTIGEN TO BE USED

The amount of antigen to be used in the test varies according to the different authors. Some use a dose exactly under the anticomplementary one, and others use one-half the anticomplementary dose. The technique which I used is the original Müller-Oppenheim reaction, as modified by Kolmer (Medical Research Committee). The antigen is used in one-half the anticomplementary dose. For the other details of technique, I adhered to the above-mentioned method.

RESULTS

The results obtained with this method are the following:—

Of 11 cases of *urethritis with no history of gonorrhœal infection.*—1 gave a doubtful reaction; 10 gave a negative reaction.

Of 22 cases of *acute gonorrhœa* of from 1 to 4 weeks' duration.—4 gave a positive reaction;

3 gave a doubtful reaction; 15 gave a negative reaction.

Of 76 cases of *chronic gonorrhœa with complications.*—65 gave a positive reaction; 9 gave a doubtful reaction; 2 gave a negative reaction.

Of 502 cases, mostly of *joint diseases,* in the Montreal General Hospital from 1928 to 1931.—231 gave a positive reaction; 271 gave a negative reaction.

Of 43 cases of *arthritis deformans.*—23 gave a positive reaction; 20 gave a negative reaction.

Of 30 cases of *arthritis with a definite history of gonorrhœa.*—26 gave a positive reaction; 4 gave a doubtful reaction. Of these 30 cases, 13 had chronic prostatitis; 9 chronic prostatitis and vesiculitis; in 8 cases the genito-urinary system was apparently normal. As to the incidence of the joints affected: 20 had arthritis of the knees; 4 of the ankles; 2 of the hip; 2 of the wrists and 2 of the feet and heels.

The results of other authors in similar conditions are the following. Engelman and Summent obtained, with this reaction, "almost always" negative results in non-complicated gonorrhœa, while in complicated gonorrhœa 75 per cent of the cases were positive, and in joint diseases due to this condition, 100 per cent were positive. Hoder, in 4 cases of gonorrhœal arthritis examined, found the complement fixation test always positive. Hastings, out of 24 cases of arthritis deformans, had 7 positive reactions. Osmond and Oliver, in 5 cases of arthritis examined, found the complement fixation positive in all. Kling and Pincus also obtained positive results in performing the test on blood serum and the synovial fluid in gonorrhœal arthritis. Hoder recognizes this test to be of practical use in chronic gonorrhœa and gonorrhœal complications, like epididymitis, prostatitis, arthritis, and especially in those cases when one wants to confirm a diagnosis. Price, having examined 7,000 cases of gonorrhœa with this method, concludes that "if the test were performed on the serum of patients suffering from arthritic joints, tenosynovitis, iritis, and particularly in women suffering from abdominal pain of obscure origin, fewer errors in diagnosis might be made."

CONCLUSION

The indisputable specificity of the test, the uniformity of results by all authors with the test in complicated cases of gonorrhœa, and especially the very great percentage of positive results in gonorrhœal arthritis, warrant the introduction of the complement fixation reaction as a routine test of inestimable value to the clinician.

A very complete bibliography prepared for this article can be obtained by those interested on application to the author.—[ED.]

PHENOLPHTHALEIN DERMATITIS.—F. G. Novy recalls the discovery in 1918 that idiosyncrasy to phenolphthalein may give rise to a chronic recurrent pigmented eruption. In view of the employment of this drug as a so-called harmless aperient, it should be realized that it has caused urticaria, herpes simplex, and chronic pigmented dermatitis. Similar eruptions may follow the administration of antipyrin, amidopyrin, and arsphenamine. Phenolphthalein eruption has been attributed to some toxic by-product. A mild transient albuminuria has occurred in a few cases. Novy describes the case of a girl aged 20 who had an itching, generalized eruption, recurring every few months. The lesions were as large as peas and intensely irritable. The patient had taken phenolphthalein for three or four years. The generalized eruption was most severe on the trunk and arms. Scattered macules were seen about the mouth and genitals; they were irregular, ranging in diameter from half an inch to three inches. Centrally, they were a deep purple, shading to a paler colour peripherally. The pigmentation persisted on pressure. The blood count showed 3 per cent eosinophiles. On discontinuance of the phenolphthalein the eruption faded slowly, but nine months later an acute exacerbation occurred; this subsided in three days under large doses of magnesium sulphate and forced fluids intake. After the eruption had disappeared (the pigmentation persisting) the patient was given a proprietary tablet containing 1 grain of phenolphthalein with aromatics and sugar. In one hour the pruritus, œdema, and erythema returned, and the pigmentation deepened; this reaction subsided in a few days. Subsequently, antipyrin and amidopyrin were given by the mouth and neosalvarsan was injected intravenously; no reactions followed. Pure phenol (1 minim in milk), phthalic anhydride, dihydroxybenzophenone, and other drugs of the same series also failed to cause eruption. Novy concludes that the eruption is due to the drug itself (in a susceptible individual) and not to any impurity, since chemically pure phenolphthalein rapidly produced a severe exacerbation.—*Arch. Derm. & Syph.*, 1932, **26:** 125.

THE FUNCTIONAL NEUROSES*

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THE subject of this paper is the study, prevention, and treatment of those functional neuroses which, if untreated, or if not treated early enough, may terminate in insanity.

The life of the late Dr. Campbell Meyers was largely devoted to the study of certain types of nervous and mental disorders, but he was particularly interested in their prevention. He was interested in those cases of functional neuroses developing in late adolescent or adult life, and of previous good mental and nervous history, in whom psycho-neurotic and neurotic symptoms formed the essential part of their syndrome. Such conditions usually follow anxiety, emotional overstrain and such allied states to which modern life is so conducive. If this illness is successfully overcome, the patient is able to return to his normal life as a good and useful citizen, thus averting any of those persistent mental symptoms which so frequently remain as a result of a period of insanity. Dr. Meyers hoped that specially equipped wards in general hospitals would be developed where intensive study and early diagnosis of these functional neurotic patients would be pursued, together with teaching of both medical student and nurse. The general practitioner should be able to diagnose a neurotic condition as easily as he does an organic disease. Dr. Meyers was of the opinion that the general practitioner and the neurologist would be particularly interested in this type of patient because the origin of such conditions was more psychological and much less of a hereditary and organic nature, and because the treatment calls for more consideration, understanding, and cooperation than the usual institutional treatment given to the psychotic, the feeble-minded and the epileptic.

The functional neuroses have always been protean maladies with protean remedies for their cure. They include the hysterias, the psychasthenias, the neurasthenias, and the anxiety neuroses, as found in our present day classification. The symptomatology is an anxiousness, restlessness, introspectionism, with morbid fears, doubts, obsessions, compulsions, inhibitions, and indecisions. In the past, functional neuroses have been the subject of controversies. Their etiology was for a long time associated with religion and mysticism and their treatment with charlatanism. The studies of Schopenhauer, Nietzsche, Charcot, Janet, Breuer, Bernheim, Babinski, Freud, Jung, Adler, Rivers, Morton Prince, McDougal, Hart, and the schools at Paris, Nancy, Vienna and Boston, have materially broadened our understandings. Charcot, a neurologist and the Director of the Salpêtrière in Paris, the greatest neurological clinic of modern times, was the first to throw any scientific light on the causation of mental phenomena, on the hysterias, and the functional neuroses. Even until the nineteenth century the disease was considered purely from the physical aspect. Not until Charcot's time was the psychogenetic aspect of disease seriously considered. He studied the causes of mental disability, the causes of the functional neuroses and of the hysterias and the psychoneuroses. At that time the opinion regarding hysteria was divided, some contending it was of organic causation, while others contended it was a malingerer's disease. Charcot differed, believing hysteria to be of psychogenic origin and that it could be reproduced artificially by suggestion or the psychic influence of an idea. He believed hysteria to be a disease of suggestion, which could be cured only by suggestion, and consequently he employed hynotism as a means of cure. His studies on hysterias later led to the psychoanalytical school and later to the establishment of psychopathology and psychogenesis.

Janet, a psychologist and pupil of Charcot, who later succeeded the latter as the director of the Salpêtrière, continued the studies of his teacher and since the year 1880 has contributed

* This essay received the Prize of $100.00, awarded under the Meyers' Memorial Fund.

to the dynamics of psychopathological states and to a better understanding of the functional neuroses. He elaborated Charcot's psychogenesis. He studied his patients' histories, and the sequence of events in their lives, and thus greatly added to the interpretation of the causation of psychopathological states.

Bernheim, of the Nancy School, contended that hypnotism was not necessary in the treatment of hysteria. His school and teaching attracted Freud and unquestionably influenced the latter's conceptions. Bernheim believed hypnotism to be unnecessary and injurious. He was of the opinion that past events in a person's life could be recalled without such an artificially induced measure. He employed his personality to quiet and gain the confidence of his patients, and then, by reassuring them, he encouraged them to talk and recall their past. He believed in ordinary talking and reasoning in the treatment of the neuroses. Babinski sums up his findings on hysteria by saying there are no hysterical phenomena except those produced by suggestion and suggestion only.

Freud's psychoanalysis must be considered. His objective was, first, to cure patients suffering with hysteria, and, secondly, to treat the neuroses. Psychoanalysis has had some success, we must all admit, in that some cures have been achieved, and that a system of psychotherapy has been advised for the removal of neurotic symptoms — namely, a hypersuggestibility therapy. His theories pertaining to the unconscious, the sexual childhood development, and his conceptions of hysteria, the anxiety neuroses, the neurasthenias, dream interpretations, have been published and require consideration, but not necessarily application. Just as we have studied psychotherapeutic measures in the remote past, such as the laying-on of hands, the stroking with magnets, mesmerizing, hypnotizing, it is now our duty to study the recent psychotherapeutic psychoanalytical theories and technique.

The psychotherapeutic treatment or investigation of these patients is commenced only after serological, neurological and physical examinations have been done to rule out any constitutional, organogenic, neurogenic, or exogenic etiological factors. If none can be discovered, then the origin of the symptoms must be psychogenic and lie in the mind and the functioning of that organ. The mind is an abstract or the subjective functioning of the brain, and as such requires special psychotherapeutic treatment to ascertain and understand the causes of abnormal mental functioning. As mentioned before in this article, situations in later adult life such as emotional overstrain, anxiety, and the allied states to which modern life is so conducive may be the precipitating causes of an acute neurotic and psychoneurotic reaction. However, the seed of the neuroses may be sown in the child, and the neuroses usually have their beginning in the mental growth of childhood, when unhealthy attitudes towards sex, home and school problems, and parental influences are induced. Unless corrected, the personality develops with this background or susceptibility to the neuroses in later adult life. All complexes have a beginning. It is necessary to trace the development of the symptoms from their beginning, step by step, using every available source of information until a full-fledged, logical interpretation of the symptoms is derived.

The past and the present treatment of the neuroses has not been very illuminating, and even to-day many cases of hysteria receive no treatment. The right treatment, early and efficiently applied, may cure these patients, and they may be spared a future recurrence if suitable understanding and direction is given them. Their treatment may require considerable time and money, and lack of these handicaps successful treatment. These patients should be kept in hospital under observation until the physician obtains a thorough understanding of the personality of his patient, of the nature and the depth of the reaction, the etiological factors, and a definite understanding of each symptom. He must obtain this knowledge from every source of information, and by having the patient talk sufficiently freely to disclose all necessary details, as one realizes that the word is the chief interpreter of the mind. These analyses, needless to say, require interest, patience, time and labour. When the physician obtains such knowledge, he is then adequately prepared to proceed with the task of making his patients understand and know themselves. He does so by a system of explanations and repetitions of realities to his patient. He hopes by this method of treatment to remove their

morbid fears and anxieties and to restore faith, happiness and efficiency, so that they may rehabilitate themselves and become useful citizens. Subsequent contact with the physician or with the hospital is a necessary prophylactic measure for the maintaining of healthy and correct mental attitudes. The above treatment is not one of hyper-suggestion, as employed in psychoanalysis, but is simply an exhaustive case-taking, and patient-talking method, with necessary interpretations, explanations and repetitions of realities. Drugs, physiotherapy, occupational therapy, dietetics play only a secondary rôle in this treatment. It is essential that these patients be treated by physicians who are specially trained in neuro-psychiatry, so that the right accommodation for each and the necessary supervision will be given. At the present time they are treated at home, in general hospitals, in sanitaria, rest homes, and hotels. There is no special hospital or separate division of any general hospital for the study and cure of these patients. In Germany, Austria and France, many are treated in the neurological institutes. It would be admirable if we had such institutions in Canada. Much money, it is admitted, is spent on the study, prevention and cure of the psychotic and the incurable mental patients. More could be spent, and well spent, on the early, hopeful, and curable type of patients. There is no doubt that many neurotic patients would be greatly benefited, and such institutions would stimulate patients to report their symptoms early. The study, prevention, treatment and research would undoubtedly develop and progress. Every physician who has had experience with such cases knows well the difficulties of treatment. Cooperation is difficult. Two or three special hospitals in Canada, or special sections in general hospitals would be the best preventive to endow for the future generations.

INTRATRACHEAL ADMINISTRATION OF NITROUS OXIDE*

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Montreal

IN a paper published five years ago on this subject a small series of cases was reviewed, and some advantages of this method of anæsthesia were pointed out. The technique of administration at that time was found to be relatively satisfactory and has not been materially altered up to the present. The recent introduction of avertin and the barbiturates may have narrowed the field for intratracheal gas, or, on the other hand, these substances may prove valuable adjuvants to the method. As this discussion will be confined solely to the administration of nitrous oxide without the addition of other gases or ether certain factors making for success must be considered. They consist briefly of (a) the type of patient; (b) the preparation of the patient; (c) technical skill. Anæsthetists desirous of employing this method must be thoroughly familiar with intratracheal anæsthesia generally before they can hope for success.

As originally conceived, intratracheal gas was devised to meet the needs of those patients to whom the administration of ether was thought to be hazardous, or who had a deeply rooted objection to that drug, and where the site of operation rendered the ordinary inhalation methods inconvenient. It still has a wide application in this field. Even without its exclusive indication, as a vehicle for greatly decreased concentrations of the more toxic anæsthetics it should be of even greater value. Perhaps in no branch of anæsthesia is it more necessary to have an idea of the patient's attitude toward operation than in this. The occasional uncooperative individual will present the same difficulties with intratracheal gas as with any other method. Heavy smokers and drinkers, especially those of a plethoric "make-up," are notoriously resistant and the anæsthetist of limited experience, or indeed any anæsthetist, would do well to use some other method in these cases. Happily, however, this class of patient usually presents no contraindication to the use of ether, and that often in rather large quantities. Where

* Read at the Sixty-third Annual Meeting of the Canadian Medical Association, Section of Anæsthesia, June 22, 1932.

definite indication exists we often have to deal with the asthenic, anæmic or tuberculous type, and these usually prove amenable subjects.

PREPARATION OF THE PATIENT

The question of preliminary medication is of great importance. The most satisfactory drugs have proved to be a combination of morphine, in divided doses, and hyoscin. The original dosage was morphine gr. 1/6 and hyoscin gr. 1/150, one and one-half hours before operation, followed by morphine, gr. ¼, one-half hour before. In the case of women morphine, gr. 1/6, is substituted for the latter dosage. The second hypodermic is given, of course, only if the first has been well tolerated. Only in one case has the second dose had to be omitted. It has been the aim to administer morphine to the extent of obtaining its full physiological effect and not as a mere mental sedative. Where this aim has been achieved respiration may be slowed to ten per minute, the pupils are small, and there is a slight tendency to duskiness in the lobes of the ears. The pharyngeal reflexes are depressed though the cough reflex is still active. Many patients are kept comfortable for the remainder of the day before the effect wears off. In certain cases complete amnesia may exist for any event connected with the operation. The purpose of this preparation may be defeated if the patient is disturbed for any reason, and it should be impressed upon the nurses that the anæsthetic has begun immediately following the first injection. Occasionally sleep is not interrupted by the application of the mask. It is this consideration which has had most weight in the question of cocainization of the pharynx as it was felt that the rousing of the patient would offset the advantages of the more depressed reflexes. The delayed recovery of the cough reflex and the possible toxicity of the cocaine are minor considerations.

Trial was made of other drugs along these lines but was not satisfactory. Even with doses of sodium amytal or avertin sufficient to produce deep sleep the cough reflex was most persistent and did not tend to disappear. The question of delayed awakening in mouth and nose operations had to be considered.

TECHNICAL SKILL

In the past many otherwise experienced anæsthetists have neglected this branch of their art mainly because of the supposed difficulties of the intubation. This should not be, and, at the risk of reiterating what has already been fully described many times, I propose briefly to review the matter. Parenthetically, it should be within the range of every anæsthetist's ability to pass an intratracheal catheter on either the conscious or unconscious subject. Many a tracheotomy has been avoided by this simple manœuvre.

With the patient fully anæsthetized, with the head in the central position and slightly extended, the laryngoscope is advanced down the mid-line of the tongue and in close apposition to it. By keeping strictly to the mid-line the epiglottis is easily located and gently lifted, exposing the glottis. The mid-line approach is important. If deviated to either side the tip of the laryngoscope may come in contact with the oro-pharynx, causing retching or even bruising and scarifying of the mucous surface. If further extension of the head be necessary to fully expose the glottis this is accomplished by steady pressure on the occiput with the right hand in order to straighten out the natural curve of the air passages. In no case is one justified in using the laryngoscope as a lever with the upper teeth as a fulcrum. In certain types of jaw it may be found simpler to advance from the side of the mouth. Using N_2O and O_2 only, anæsthesia must be complete before an attempt at intubation is made, as the anæsthetist must be prepared to introduce the catheter in from twenty to thirty seconds. Ordinarily this will give ample time, without the necessity for haste, but sometimes it may be necessary to repeat the induction or even to add a very small quantity of ether. If too much ether be used coughing and salivation may occur and it will then be necessary to proceed to full ether-anæsthesia.

The use of a combination of gas, oxygen and ether ceases to constitute intratracheal gas anæsthesia and does not fall within the scope of this paper. If ether be used throughout the operation it would be better, on grounds of simplicity and economy, to change over to the air-ether sequence. With increasing dexterity the necessity for repeated attempts at intubation will be largely obviated.

Much stress has been laid on the size and form of the catheter used. The complete exclusion of atmospheric air, so necessary in N_2O

anæsthesia, has been obtained to a degree of perfection by the ingenious inflatable bag catheter of Guedel and Waters. Combined with the CO_2 absorption apparatus the method is in a class by itself. The advantages claimed are exactitude of dosage, exclusion of foreign matter from the trachea, and economy. Practically, the absolute mechanical exclusion of air does not prove to be as essential as might be supposed. Under a low pressure feed, inspiration and expiration proceed around the catheter in inverse proportion to the size of the latter. Only on rare occasions does the necessity arise for positive pressure, and this can easily be obtained when required. Operations on the lungs and mediastinum constitute but a small proportion of general surgery. In routine work a minimum interference with the normal respiratory movement seems to produce the most uniform anæsthesia. For this reason packing of the oro-pharynx around the catheter has not been resorted to. In intratracheal gas anæsthesia the pharyngeal reflexes frequently resent this stimulation and the balance of anæsthesia is upset. The danger of inspiration of foreign matter can be overcome by the use of the suction apparatus. It is an open question if it constitutes any real danger when it does occur.

The catheter used should be fairly rigid and proportionate to the size of the glottis; No. 28 to 32 Fr. gives a selection suitable for most adults. A section of stomach tube may be used. This is not too large to pass easily between the vocal cords and fills the lumen of the trachea comfortably. It should be passed well into the trachea, 25 cm. from the upper teeth on the average. A cough will usually occur, but does not persist. If it does, it is permissible to increase the pressure temporarily. When saturation takes place oxygen is added according to the individual need.

Any modern gas machine is suitable. The rebreathing bag should be of about 2 litres capacity. Interposed between this and the catheter is a blow-off valve of the ordinary spring type. When regular breathing is established this valve is adjusted to permit escape of the last part of expiration. The position of the valve is important in that it prevents that part of expiration richest in CO_2 returning to the bag. No other safety valve is necessary. The mercury manometer does not reflect the pressure in the lungs. Its reading rises as the size of the catheter decreases, the rate of flow of gases remaining equal. As the administration does not depend on positive pressure a flow of four to six litres a minute is generally sufficient. No great inconvenience from the inevitable excess of inspired CO_2 is noticed. The bag may be manually emptied at intervals and filled with fresh gases. It must be remembered that the morphia injections have lowered the sensitivity of the respiratory centre to CO_2. The question of leakage of air around the catheter cannot be ignored, but with a large catheter deeply placed in the trachea it is doubtful if this auxiliary respiration greatly exceeds in volume the capacity of the upper air passages, which must necessarily contain the anæsthetic gases in considerable concentration. A minimum obstruction to normal respiration is desirable for a level anæsthesia and this space constitutes a natural safety valve for the expanding and contracting lungs. It cannot be denied, however, that the presence of air explains the rather narrow margin of anæsthesia and the necessity for preliminary medication.

Of incidents arising during the administration there are few. The patient's colour is the only index for oxygen proportion, which rarely will go above 10 per cent. Once anæsthesia is established, the visible oxygen required may fall to a surprising extent, or even to zero. If, for no apparent reason, the level of anæsthesia becomes disturbed the bag should be emptied and filled with fresh gases. Sudden coughing should be met by disconnecting the catheter and suctioning off secretions. This should also be done at the final withdrawal of the catheter.

There is no reasonable limit to the duration of anæsthesia. Removal of a tumour of the spinal cord requiring four hours' anæsthesia was well borne by the patient. If the patient is not visible to the anæsthetist respiration may be observed by the excursions of the rebreathing bag. Shallow respiration and rapid pulse are usually due to hæmorrhage, and are to be met by increased oxygen percentage. Awakening and convalescence are usually prompt and uncomplicated, and the general condition of the patient amply repays for the slight extra trouble taken.

A SUGGESTION FOR THE ADMINISTRATION OF IRON

BY G. H. W. LUCAS AND V. E. HENDERSON,

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Toronto

DURING the past two or three years a great deal of new light has been thrown on the physiology and pharmacology of iron. All the evidence indicates that no matter in what form iron is given, whether it be a pharmacopœial preparation or food iron, only that portion of it which is converted into a soluble ferrous state and reaches the upper intestine in this condition can be absorbed. During normal digestion of a well-balanced diet, enough iron is split off in a soluble form from organic food iron to furnish the body with its daily needs. In many cases of secondary anæmia, however, the iron content of the body has been depleted, and to produce a rapid cure a large amount of this soluble ferrous iron is necessary, to enable hæmoglobin to be built up in increased amounts rapidly, and, especially if peptic digestion is poor and hydrochloric acid deficient, the formation of ferrous iron is more difficult. The recently suggested use of large doses of iron in any form is usually successful. While the use of copper has been advocated, its value in hæmoglobin formation in these anæmias has not as yet been established.

A rough calculation of the amount of hæmoglobin produced in the body in certain of the published cases of secondary anæmia treated successfully with 75 grs. of reduced iron daily suggests that in the early stages of treatment the patients converted into hæmoglobin the equivalent of 1½ grs. of iron per day, but as time went on and the hæmoglobin approached normal only about 1 mgrm. (1/65 gr.) was converted into hæmoglobin. In other words, the maximum conversion into hæmoglobin was less than 2 per cent of the iron given. This percentage rapidly diminished as the hæmoglobin increased, until it reached about 0.01. The remainder of the 75 grs. apparently passed through the alimentary canal without being absorbed. Some authorities believe that the presence of large amounts of iron salts in the intestine and stomach may upset gastro-intestinal digestion. The experimental evidence indicates the following changes in inorganic iron.

(a) The solution of the perchloride of iron containing ferric chloride reacts readily with proteins and the iron is precipitated. Hence, when given when the stomach contains protein in the food the reaction will take place largely with the food proteins, while on an empty stomach it would tend to react with the mucosa, as it does when applied as an astringent. All ferric iron reacts with protein to form a precipitate which is non-irritant. In this form the iron cannot be absorbed. The food, however, has some reducing action, and consequently converts some of the ferric iron to ferrous, which does not precipitate proteins, and entering the upper intestine the ferrous iron is available for absorption. Even if ferric chloride reached the intestine, it would react with the proteins present and form precipitates; and as the protein was digested and the iron set free, the carbonates present in the intestine would precipitate the iron and render it non-available.

(b) Reduced iron in the stomach is attacked by the free hydrochloric acid and small amounts of ferrous chloride appear. The amount so formed depends on the amount of acid present and upon the surface of the iron exposed, upon which the reaction may take place. In the acid medium of the stomach and in the presence of excess reduced iron any ferrous chloride produced remains in this stage, and after passing into the intestine is absorbed. It must be borne in mind, however, that only a small percentage of the reduced iron given, ever becomes available. Other acids in the stomach, mainly carbonic, will produce much smaller amounts of ferrous salt.

(c) Iron and ammonium citrate is frequently administered in large doses, because it is a non-irritant salt, *i.e.*, is not in an ionized state. Until some of this salt has been reacted upon by the free hydrochloric acid in the stomach,

and free ferric ions are liberated which may be reduced by the food to ferrous ions, none of it is available. Here again, as with reduced iron, large doses give greater facility for the action of hydrochloric acid and increase the chances of the formation of some ferrous salt.

It appears, therefore, that the natural process in the stomach and upper intestine is to produce ferrous chloride and, curiously enough, this salt is the most easily absorbed. The sulphate and bicarbonate are absorbed, but not to the same extent. Some investigators found that about 1½ grains of iron given in this ferrous state have shown as good results clinically as from far larger doses of iron in other form. The difficulty lies in preparing a ferrous chloride in a suitable state for administration, owing to the ease with which it is oxidized.

A fairly stable syrup of ferrous chloride was prepared in this laboratory and through the kindness of Dr. Duncan Graham, of the Toronto General Hospital, it was administered to patients with anæmia by Dr. R. F. Farquharson. The amount given was approximately 1½ grains daily. The clinical results obtained by Dr. Farquharson, in a limited number of cases, seems to justify the claims made by other investigators. In consequence, the pharmaceutical method by which ferrous chloride in a palatable form can be prepared is published for the benefit of others who wish to see whether this suggestion is of value.

The first syrup was prepared by reducing the solution of perchloride of iron with an excess of reduced iron, and analyzing the liquid so formed for ferrous iron with potassium permanganate, after it had been acidified with hydrochloric acid to stabilize it. After the analysis the liquid was so diluted with syrup that one fluid drachm contained approximately ½ grain of iron in the form of ferrous chloride. This dose of syrup, diluted to about one ounce with water, was given three times daily after meals. It contains a small amount of free hydrochloric acid which may aid digestion.

For the physician who wishes to do his own dispensing, or for the pharmacist, this method involves too much chemistry, and a simpler one has been devised, which is given in both imperial and metric systems:—

℞	Ferri Redacti	gr. xxiv
	Acidi Hydrochlorici Diluti	℥ i
	Syrupi ad	℥ vi

Misce. Fiat mistura.

Signa. ℥ i t.i.d.p.c.

℞	Reduced Iron	1.13 grm.
	Dilute Hydrochloric Acid	20 mils
	Syrup to produce	120 mils

Dose, 3.5 mils three times daily after meals.

The reduced iron and acid are placed in the bottle and may be allowed to stand loosely stoppered until effervescence has ceased and all the iron has disappeared. Warming the contents greatly hastens the reaction. After the reaction has ceased, the solution is filtered if necessary and the bottle is filled with simple syrup. This syrup will keep for about a month under ordinary conditions, if protected from direct sunlight. It may become a very pale yellow, but only a trace of ferric iron is present. When stored in brown bottles in a cool place, it will keep much longer. Each drachm dose, as before, contains approximately half a grain of iron in the form of ferrous chloride. When prepared according to this recipe analyses have shown that the amount of iron as ferrous chloride is fairly accurate, when a good brand of reduced iron is employed. There is an excess of acid, each fluid drachm of syrup containing about 2 to 3 minims.

For convenience in measuring the dose for children it is a simple matter to dilute the above syrup with simple syrup, until each fluid drachm contains the required amount.

There is no intent in this paper to cast any doubt on the efficacy of adequate doses of iron given in any of the ordinary forms, but simply to suggest a method whereby the iron may be given in a more available form, and consequently, much smaller doses are required.

Speak so between two enemies that thou mayest not be put to shame if they become friends. Between two men contention is like fire, the ill-starred backbiter being the wood-carrier; when both of them become friends again he will among them be unhappy and ashamed. To kindle fire between two men is not wise, but is to burn oneself therein. Converse in whispers with thy friends, lest thy sanguinary foe may hear thee; take heed of what thou sayest in front of a wall, because an ear may be behind the wall.—*Maxim XIII* of the Sheik Sa'di of Shiraz.

Case Reports

BENIGN PAPILLOMATA OF THE GALL-BLADDER AND BILIARY DUCTS*

BY CHARLES K. P. HENRY,

Montreal

The occurrence of primary intra-biliary benign papillomata is rare, and its recognition clinically, as a cause of partial or complete obstructive jaundice, offers considerable difficulty in diagnosis, which usually must be only pre-operative and suggestive. "No one living is infallible in the differential diagnosis of obstructive jaundice; the diagnosis is always difficult, and the chance of a life saved so important that I advise operation in all cases." (Moynihan).

The incidence of painless, incomplete obstructive jaundice in patients of middle or later age is so often thought to be due to carcinoma of the pancreas (which, as regards a cure, is beyond the relief of surgery) that I believe patients who are suffering from benign papillomata are often not operated on. Although, even if carcinoma, which is usually impossible to remove, be found, the misery of the terminal months of jaundiced life may be prevented by a short-circuiting operation, analogous to gastroenterostomy for carcinoma obstructing the pyloric antrum. The gall-bladder may be anastomosed to the stomach or the duodenum, or the common duct to the duodenum, with relief from the obstructive jaundice.

Papillomata occur as benign tumours in the gall-bladder, in the cystic duct, in the common duct, or in all three areas. One growth may seed itself elsewhere in the biliary tract in many places, and may cause obstruction at any point therein. The Mayo Clinic, in the twenty years ending January 1, 1930, had only 4 cases of benign tumour and 49 cases of primary carcinoma in the extra-hepatic bile ducts.[1] In the Montreal General Hospital benign papillomata of the bile ducts have been extremely rare, though A. T. Bazin[2] reported one such case in a male, aged seventy years, with repeated attacks of colic together with jaundice of temporary duration. It was noted that the attacks of pain were less severe than is usual in gallstone colic. This tumour was removed from the common duct. Marshall[1] stated that he could find only 12 cases reported in the literature of benign papillomata of the bile ducts. It is obvious that this condition is sufficiently rare to make it advisable to report all such cases, and to emphasize the necessity of operation, even if a malignant growth is diagnosed as the cause of the obstructive biliary symptoms.

Mrs. J. B., aged fifty-five years, was admitted, walking, to the private service of Dr. D. Grant Campbell, in the Montreal General Hospital, on April 19, 1932. She had been ill since Christmas, 1931, had lost about twenty-five pounds in weight, had upper abdominal discomfort, anorexia, and a distaste for fat or oily food; she tired easily and was slightly jaundiced. In 1929 she had had a tonsillectomy done, with post-operative hæmorrhage, and had not regained her usual health. She had had no severe colic, but had "soreness" in the right upper abdomen. She showed hypertension; her blood pressure was 178 systolic and 110 diastolic; she had a distended abdomen with tenderness and a large mass in the region of the gall-bladder; the liver was not palpable. She had some fever. There was a marked secondary anæmia; the red blood cells were 2,430,000; the hæmoglobin 60 per cent. Diminished sugar tolerance and delayed assimilation were present. Urobilinogen was present in less than 1 in 10 dilution: and there was non-visualization of the gall-bladder after the intravenous dye.

Here, then, was a picture of incomplete biliary obstruction, coming on over a period of five months. Her medical attendant made a tentative diagnosis of carcinoma of the head of the pancreas or of the gall-bladder. Operation was advised, and, though her medical attendant was somewhat skeptical of its value, it was easily performed under nembutal and spinal anæsthesia, on April 25, 1932. There was hæmorrhagic fluid about the mass, which was a large gall-bladder, larger than a grapefruit, and adherent to adjacent structures. This

* Read before a regular meeting of the Montreal Medico-Chirurgical Society, February 17, 1933.

was freed, with the cystic duct, up to the common duct. The cystic duct was quite large, about the size of one's little finger, and on ligating it and cutting it, I went through what I took to be carcinomatous tissue. The common duct felt somewhat pulpy and it appeared unwise to explore it farther, as it seemed to be filled with tumour. No bile flowed from the cystic duct where the ligature had cut through. This was re-ligated and further exploration revealed no tumour in the pancreas; no glands were enlarged and no nodules were found in the peritoneum. Until the gall-bladder and ducts had all been freed and dissected out there was no suspicion of an intra-biliary growth being present, and I expected to find a stone in the common duct, with associated cholecystitis.

The patient made a good recovery, and beyond a slight pulmonary infarct had no complications, and she was discharged on the twenty-fourth post-operative day. Her jaundice disappeared and she had no further digestive disturbances; she later regained her weight and got about again.

The specimen removed at operation consisted of a large gall-bladder, 15 by 7 by 7 centimetres, which was tied off at its proximal end.

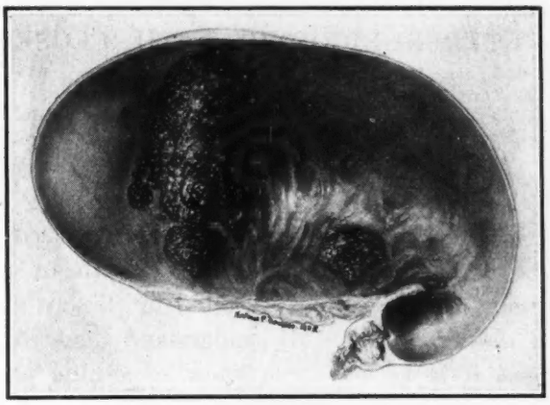

FIG. 1.—Papillomata in the gall-bladder.

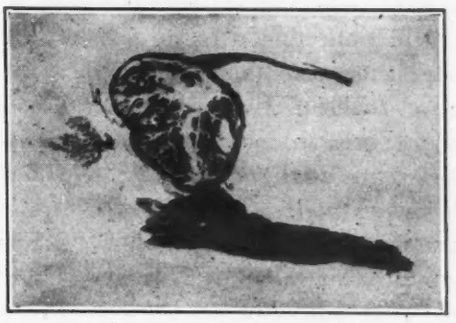

FIG. 2.—Shows part of the wall of the gall-bladder and a cross section of the cystic duct filled with the papillomatous growth. This was the cause of the hydrops of the gall-bladder.

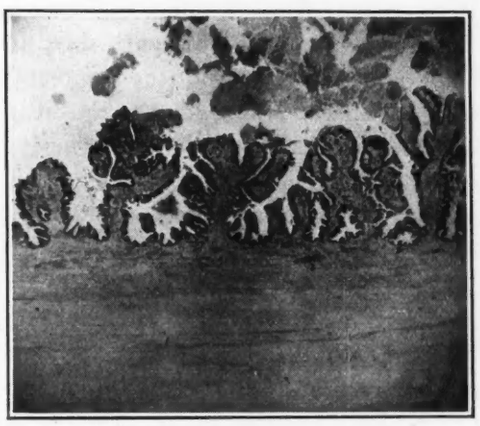

FIG. 3.—Shows the frond-like papillomatous growth in the wall of the gall-bladder. In no place is seen any tendency to infiltration of the submucosa.

FIG. 4.—Illustrates a transverse section through a stem of a papilla of the gall-bladder. The stem is clear-cut and there is no infiltration of the tumour through the basement membrane of the wall, and the stem shows no cellular infiltration.

FIG. 5.—Is a high power micro-photograph which illustrates clearly the benign character of these papillomata.

The cystic duct was kinked on to the gall-bladder, and was whitish-yellow, firm and indurated. The gall-bladder was moderately distended, with no stones palpable, and was reddish-pink in colour. On opening it, after fixing in formalin, the cavity was found to be filled with blood and no stones were seen. There did not appear to be any mucosa, the interior being smoothed out, with only faint traces of trabeculation. There was a sessile, verrucous growth, occupying one-half of the circumference at the fundus, 2.5 centimetres in width and extending 6 centimetres around the lumen, with the papillomatous projections making up this tumour of a red colour and covered with adherent blood clot. There were several smaller, isolated tumours, similar in form, some the size of a split pea, and one the size of a ten cent piece, near the valve, the free edge of which was covered with minute papillomata (Fig. 1). Immediately below it, filling the lumen of the cystic duct, was a papillomatous growth which seemed to arise from the wall of the duct and almost obliterated the lumen (Fig. 2). This was bulging from the cut end of the duct. It was white, soft and friable.

The primary origin was likely in the wall of the gall-bladder, and yet the mass in the cystic duct and in the common duct might have been the primary growth; certainly the latter caused the jaundice and the former the dilated gall-bladder.

Dr. L. J. Rhea, Director of the Pathological Department of the Montreal General Hospital, has prepared a series of sections from the gall-bladder and the cystic duct.

DISCUSSION

It is wise to explore all cases of obstructive jaundice, even if apparently due to obstruction from a growth, presumably malignant.

The ducts should be explored, and often a tumour mass may be removed. In the above-described case it would appear that the common duct should have been opened, and possibly more benign papillomatous masses could have been removed. The macroscopic appearance, however, so strongly pointed to cancer that this was not done.

The occurrence of intra-biliary benign tumours, papillomata and fibromata, the latter chiefly in the gall-bladder or in the intra-duodenal duct portion of the biliary channel, should be constantly kept in mind, even if this happens only occasionally.

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2. BAZIN, *Ann. Surg.*, 1930, 92: 659.

UTERUS BICORNIS WITH CLOSED ACCESSORY HORN

BY W. CARLETON WHITESIDE, M.D.,

Edmonton

Malformations of the uterus are caused by errors in development. The growth of any organ may be simply arrested or it may grow in the wrong way. To understand these conditions it is necessary to know something about the development of the organ.

The first indications of the genito-urinary organs are the Wolffian ducts. These appear in the embryo about the fifteenth day, and the Wolffian bodies appear about the eighteenth day. These structures help to make up the future kidney and genital apparatus. They lie on either side of the mid-line. In the fourth week of embryonic life other ducts appear near the Wolffian body of each side. These are the Müllerian ducts and are those we are directly interested in at the present time. The lower portions of Müllerian ducts become fused to form the vagina and the uterus, while the upper ends go to form the Fallopian tubes.

In the anomaly presented by a bicornuate uterus failure to unite involves the upper section only. There are various depths to the notch between the two horns. The horns vary in size; they may be equal, or one may be greatly distended, as in the case to be presented. The cervix may be single with one opening; it may have two openings; or it may be completely separated into two cervices, each with a separate opening.

CASE REPORT

H.G., aged 15 years, school girl.

Complaints.—Severe cramp-like pains in the pelvis lasting for six weeks; last menses one month previously, which lasted but one day; constipation for two months. For six weeks the patient had experienced severe cramp-like pains in the uterine region, aggravated by her menses.

The pains resembled those of the first stages of labour and had become progressively worse during the last few days, necessitating morphia; her last menses caused her excruciating pain. She noticed that the constipation had definitely increased during the previous two months.

The patient first menstruated at thirteen years of age. The periods were absent every second month for four months, then absent for six months, followed by a regular flow until the present trouble. The patient has three sisters all of whom were free from similar discomfort.

Physical examination.—The patient was a well developed, well nourished white female, not acutely ill, but evidently in extreme pain; not able to lie or sit because of the discomfort, Temperature, pulse, respirations normal. Except for the pelvis a complete physical examination was negative. The perineum was firm, the hymen intact; the vagina admitted one finger; no discharge present; a small conical cervix. A definite mass could be palpated in the right fornix, pushing what was thought to be the uterus to the left. This mass was the size of a baseball and could be easily palpated per rectum. The right ovarian region was definitely tender, and here an irregular mass was palpated through the abdominal wall. The pouch of Douglas was also occupied by a mass firm to the palpating finger.

Laboratory tests were negative. Lipiodol was not used.

Operation. — Uterus bicornis, hæmatometra, hæmatosalpinx. Ether was employed. A median incision was made from pubes to umbilicus. On opening the peritoneum a very markedly distended tube, arising from the right side, was found coiled up on itself; when stretched out it measured seven inches and two inches in its widest diameter. The tube was ligated and removed. The ovary was a degenerated mass and was adherent to the tube. The uterine portion of the tube was cut away and an opening made into the cavity of the uterus. Six to eight ounces of chocolate-coloured blood escaped through this opening. Further investigation revealed a bicornuate uterus, the left horn being normal. The right cornu was distended with blood as there was no exit through the cervix from this cornu. The distended cornu was removed, leaving the left intact as there was no opening from one to the other. The raw surface made in the left cornu by removing the right was closed in by sutures and the folds of the broad ligament brought over it. The left tube and ovary were normal. The pelvis was filled

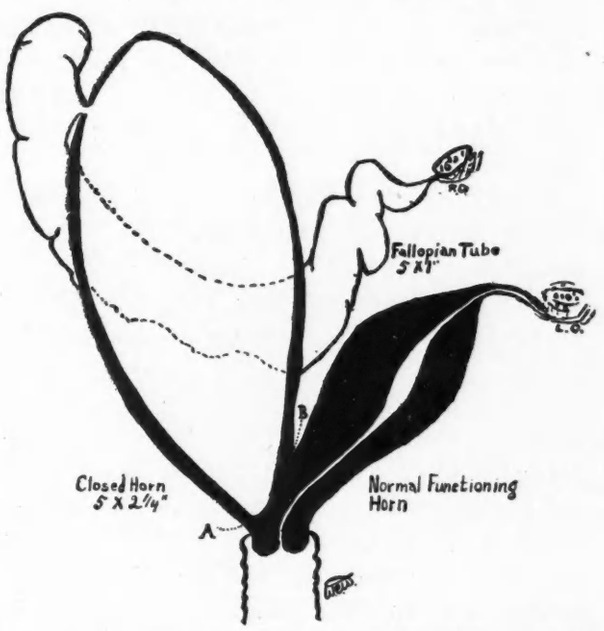

FIG. 1.—The large mass represents the cornu distended with old chocolate-coloured, thick menstrual fluid, this fluid had passed out into the Fallopian tube which was also much distended and very thin-walled, threatening early rupture.

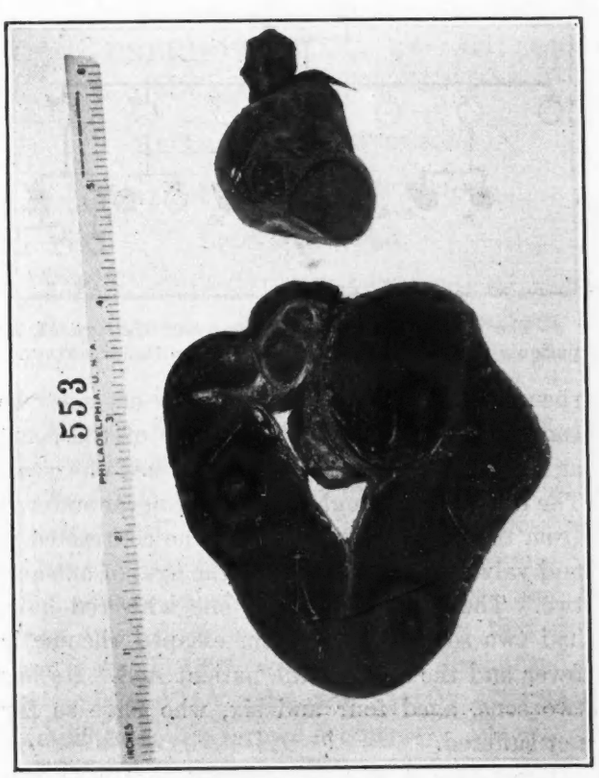

FIG. 2.—The right tube after removal and cross-sectioning (hæmatosalpinx).

with normal saline and the abdominal wall closed tightly in layers with chromic gut. Recovery was uneventful. Recall two months later indicated that the patient had normal menses without any discomfort whatsoever.

A CASE OF RHEUMATIC FEVER WITH FAMILIAL AND HEREDITARY CHARACTERISTICS*

BY HEBER C. JAMIESON, M.B., F.R.C.P. (C.),

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The familial incidence of rheumatic fever appears to be well established. The percentage of patients with rheumatic fever giving a history of others in the same family suffering from the disease has been given as from 20 to 50. Cohn, quoted by Paul,[1] called attention to the fact that there were from 8 to 10 per cent of exposed persons as against 2.9 per cent in the family of healthy controls. The importance of heredity has also been stressed, particularly by the French. Paul quotes Widal as follows: "That which is hereditary is not rheumatism; it is a general state, it is the development of the germ of polyarthritis. . . ." Swift's theory of allergy may offer an explanation of an hereditary tendency. It may be stated, however, that despite the careful work of numerous investigators the influence of heredity in this disease is largely speculative.

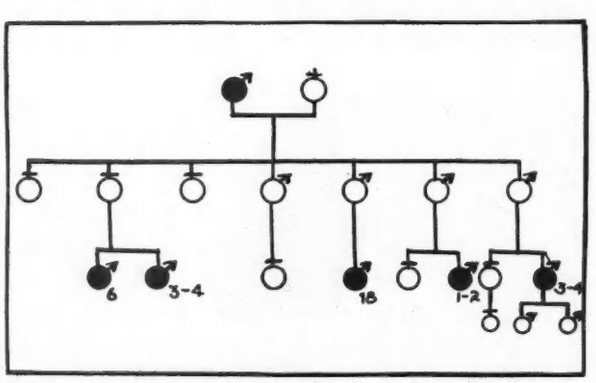
Rheumatic fever is more common between the ages of 5 and 15. Miller[2] has, however, collected from the literature 19 cases under the age of one, and as many more have been reported in children as young. This incidence of first attacks rises until it reaches a maximum about the age of 7.

There is a question as to the influence of sex. From an investigation of some 400 hospital cases, Wilson *et al.*[3] found 61 per cent females and 38.8 males. Mackie,[4] however, after a review of several hundred cases, reported an equal division between the sexes. Osler says that between the ages of 10 and 15 girls are more prone, and up to the age of 20 females predominate. Whether or not rheumatic fever is an infectious disease is yet unsettled. The following survey of a rheumatic family is of interest.

CASE REPORT

A.B., a male, aged 34, a dentist, had had rheumatic fever with valvular disease at the age of three, with recurrences every few years until the present. In the last six years he had had three attacks, one of them following tonsillectomy.

Family history.—On the maternal side there was no history of rheumatism. The paternal grandfather had had the disease for about two months every fall for years, until the time of his death at 78. No valvular disease was detected. He had had seven children, three daughters and four sons, none of whom suffered from rheumatic fever. Two of the daughters did not marry. The third had two sons. Both had rheumatic fever with valvular disease, one dying at the age of six from a first attack of this condition; the other had his initial attack between three and four, followed by recurrences, but is now living at the age of thirty-three. Of the sons, one had a daughter who has never had



The figures in this Chart represent the age of the patients at the initial attack of acute rheumatic fever.

rheumatic fever; a second had only one son who contracted it and valvular disease of the heart at the age of eighteen and was in bed one year. The third had a daughter who had never suffered from this affection, and a son who contracted it and valvular disease between the ages of one and two. The fourth, the only one with red hair, had two sons, one of whom escaped rheumatic fever and the other is the patient A.B. He has two sons, aged four and six, who have so far not suffered.

From this it will be observed that a grandfather having recurring rheumatic fever with-

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out valvular disease had seven children unaffected. Five of these children had offspring. Six were sons and 5 of these contracted rheumatic fever, and all had valvular disease. There were two daughters, both of whom are grown up and have so far escaped. No family had more than two children.

In only one of these were there two patients, and an interval of several years having intervened between their separate initial symptoms, the question of communicability does not enter into the picture.

The high incidence of valvular disease in the families of these grandchildren is of interest.

The fact that one generation escaped entirely and that the next one showed such a high incidence of both rheumatic fever and valvular disease should be noted. The sons of the daughters suffered, but the daughters of the sons were passed over. All females in both generations were exempt.

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2. MILLER, *Tr. Am. Pediat. Soc.*, 1899, 11: 79.
3. WILSON, LINGG AND CROXFORD, *Am. Heart J.*, 1928, 4: 164.
4. MACKIE, *Am. J. M. Sc.*, 1926, 172: 199.

A CASE OF BILATERAL SPONTANEOUS PNEUMOTHORAX IN AN AMBULATORY PATIENT

BY LACHLAN MACPHERSON,

Saint John Tuberculosis Hospital,

Saint John, N.B.

J. L., a white male, aged 26, married and a boiler-maker by occupation, was admitted to hospital on April 21, 1932, his only complaint being "soreness of lower part of chest."

Family history.—Irrelevant; there was no known contact with tuberculosis.

Past history.—He had always enjoyed good health until November, 1928, when he complained of the same symptom as on consultation. Pulmonary tuberculosis was diagnosed and he was treated in a sanatorium from that date until April, 1929, when he was discharged as a "minimal A" case, and shortly afterwards returned to his former occupation. He was re-examined in March, 1930, and found to have an increase of disease by both physical and x-ray examination. No further treatment was taken, and he continued his work until October, 1931, when he was laid off, and had been out of employment since, though leading an active life.

Present history.—On April 15, 1932, he again presented himself at the sanatorium, where he was first treated, for a "check-up." He walked five miles from the railway station to the hospital, and stated that he felt quite well, except for "soreness through the lower part of his chest" of three weeks' duration. He denied all other symptoms, and appeared reasonably well, but was found to have lost 10 lbs. in weight from his previous record. His temperature was 99.4°, and pulse, 96.

Physical examination of the chest.—Right: Impairment of percussion note over the upper third of the chest, both front and back. The breath sounds were distant, and, on coughing, moderately coarse and dry râles were heard over the entire front of chest and upper two-thirds over the back. Left: Impairment of the percussion note over the entire side, both front and back; diminished breath sounds; and, on coughing, moderately coarse râles over the upper one-third, front, and interscapular areas, posteriorly. No physical findings definitely indicating pneumothorax were elicited.

X-ray demonstrated a partial pneumothorax on both sides, most marked in the left, there being about 40 to 50 per cent of collapse, and about 30 per cent collapse on the right.

The patient refused to remain in hospital at that time, and on April 21, 1932, was admitted to the Saint John Tuberculosis Hospital. He still complained of "soreness through the lower chest," and in addition, admitted having had a cough for two days, but no other symptoms.

He appeared to be fairly well nourished, had no respiratory distress; and walked about the hospital like a normal individual. His weight was 120 lbs; temperature, 98.6°; pulse, 98. Examination of the chest at this time showed the heart displaced to the right. The normal area of cardiac dullness was hyper-resonant, and there was no impulse to the left of the sternum. The heart sounds were distant and best heard in the fifth interspace, right, two inches from the mid-sternal line. Percussion: Right; dullness to 3rd rib and 7th vertebral spine. Left; slight dullness to 2nd rib, then hyper-resonant to base, anteriorly, and about

normal resonance, posteriorly. Auscultation: Right; diminished bronchovesicular breathing to 2nd rib and 5th vertebral spine, and then increased to base in front, and markedly diminished near base, posteriorly. On coughing, moderately coarse râles to the 4th rib and 7th and 8th vertebral spines. Left; breath sounds were diminished throughout, and on coughing, moderately coarse râles below the 3rd rib near sternum and a few deep seated crackles in interscapular region.

X-ray showed the heart and mediastinum to be displaced to the right, with about 30 to 40 per cent of collapse of the left lung, and a dense area of disease in the lung. The right lung showed rather extensive fibro-caseous disease, with several areas of calcification from the first to the fifth rib. In the extreme apex and just above the diaphragm at the lateral wall were two small air pockets. The sputum, which was mucoid, was negative for tubercle bacilli on repeated examination.

Owing to the patient's apparent comfort and well-being, it was decided to continue the compression, and after observing him for one week, 300 c.c. of air were introduced into the left pleural space, and a few days later an attempt was made to re-establish the collapse on the right, but this was unsuccessful. The pneumothorax has been continued with greater compression on the left. There has been no appearance of fluid at any time. The man remains asymptomatic, with the exception of an increase of pulse rate for a few hours following one refill, when it went to 146 per minute. He has gained four pounds since admission.

SUMMARY

A case of bilateral spontaneous pneumothorax — an extremely rare condition — is reported in an ambulatory patient, without any of the usual symptoms or sequelæ, in which the compression was maintained on one side. It may be noted that the physical findings were not in total accord with the condition present, and although pneumothorax could be diagnosed on the left it was impossible even to suspect it in the right.

We are indebted to Dr. P. M. Knox, of Jordan Memorial Sanatorium at River Glade, N.B., who first diagnosed the condition and kindly supplied the history, physical findings and films in the case, previous to his admission to the Saint John Tuberculosis Hospital.

POST-VACCINAL ENCEPHALITIS.—C. Armstrong discussing the etiology of what he prefers to call "post-vaccination encephalitis," says that about 700 cases have now been recognized throughout the world, of which 40 per cent have proved fatal. Cases have been observed after the use of rabbit brain virus, as well as of calf virus. The European cases have usually followed multiple insertion vaccinations, while in the United States all but one of the seventy-one cases recorded here occurred after single insertion vaccinations. The disease has been most common after late primary vaccinations, though a few cases following secondary vaccinations have been recognized; primary vaccination during the first year of life is rarely followed by encephalitis. The nervous complications may develop from a few days to several weeks after vaccination, but there is a striking tendency for them to appear from the tenth to the thirteenth day, when the vaccinia is at its height. The changes in the nervous system are similar to those seen in encephalitis following other acute infections—namely, adventitial and periadventitial round-cell infiltration throughout the brain and cord, together with areas of myelin degeneration. The fact that in experimental vaccinial encephalitis in animals demyelinization is inconspicuous is held by the author to indicate that post-vaccinal encephalitis is not a vaccinal encephalitis. The paucity, or even apparent absence, of vaccinia virus in the central nervous system lesions of post-vaccinal encephalitis and its abundance in experimental vaccinial encephalitis is a further difficulty in accepting the view that post-vaccinal encephalitis is essentially due to the vaccinia virus. As regards prevention, the author has performed experiments on mice which indicate that the mortality following intracerebral inoculation with vaccinia virus is less in animals which have previously been immunized against diphtheria toxoid given subcutaneously than among control animals. In view of this non-specific immunity it is suggested that primary vaccinations, especially after the first year of life, should be deferred until after immunization against diphtheria has been accomplished. In practice the author advises giving the first dose of toxoid at the age of 6 months, the second dose one month later, and performing vaccination against small-pox three to four weeks subsequently. The same order is recommended also for older children.—*Pub. Health Rep.*, July 22, 1932, p. 1553.

Editorial

ERYTHEMA NODOSUM

ERYTHEMA nodosum, while not a particularly common affection, is of such a clean-cut character that it has always aroused interest and some speculation as to its etiology. Nearly fifty years ago McKenzie[1] expressed the opinion that it was rheumatic in character and for many years thereafter this view was taught dogmatically in the medical schools. The clinicians of that time pointed to the facts that erythema nodosum was a febrile affection, setting in after a period of malaise, with sore throat, a moderate leucocytosis, and a variable degree of polyarthritis; moreover, it was sometimes complicated with pleurisy or pericarditis, and not infrequently recurred. Hence the resemblance to rheumatic fever. But doubts began to assert themselves. Endocarditis was not found to occur often in erythema nodosum, and the disorder was not very amenable to salicylates. Lendon,[2] in 1905, advanced the view that erythema nodosum was a specific fever, with a seasonal incidence, a period of incubation, an orderly sequence, and infectivity, and it began to be called "nodal fever." Then observations began to accumulate that rheumatic fever is due to a streptococcal infection, and the association in some cases of erythema nodosum with streptococcal angina and the discovery by Rosenow[3] of a streptococcus in the nodes somewhat strengthened the argument for the rheumatic nature of erythema nodosum. During the past ten or twelve years, however, a new conception of the matter has been advanced with much force, namely, that erythema nodosum is a manifestation of tuberculosis. This view has been supported with much clinical and other evidence, notably by Vetleson,[4] Massini,[5] Wallgren,[6] Symes,[7] and Landau.[8] Let us relate some of the facts that are pertinent to the discussion.

Erythema nodosum is most commonly found in young adults, from sixteen years to twenty, and in females more often than in males. It is particularly common in nurses, as pointed out by Cruise[9] and corroborated by others. In many instances it follows some other clinical condition of an infective character, such as influenza, scarlatina, tonsillitis, typhoid fever; after an operation, after the injection of diphtheria toxoid (Cushing). Ten per cent of cases, in Cushing's experience,[10] had second attacks. Many cases, though not all, react to tuberculin. Many of the patients with erythema nodosum are the subjects of tuberculosis at the time or develop various tuberculous manifestations later. In dealing with erythema nodosum as a complication of tuberculosis, the statement has been made that material taken from the nodes and injected into guinea-pigs gave a positive result[11] (*i.e.*, for tuberculosis).

The idea that erythema nodosum is a specific infection and, therefore a disease *sui generis*, has until lately been supported only by clinical evidence, which, of course, is not conclusive. Recently, however, Moon and Strauss[12] have published some work, which, if confirmed, may establish a definite etiology for some, at least, of the cases. These investigators have cultivated a micro-organism of the genus *Corynebacterium* from the nodes in three cases of erythema nodosum and also from the blood in one of these cases. Twelve rabbits and two guinea-pigs were inoculated intravenously with fresh cultures of the organism, and thirteen animals developed lesions which had the same histological features as erythema nodosum. The same organism was recovered in the experimentally-produced lesions. Further,

1. McKENZIE, *Brit. M. J.*, 1886, **1**: 99.
2. LENDON, Nodal Fever, Baillière, Tindall & Cox, London, 1905.
3. ROSENOW, *J. Infect. Dis.*, 1915, **16**: 367. (R. thinks this may have been a form of diphtheroid.)
4. VETLESON, *Tubercle*, 1922, **3**: 433.
5. MASSINI, *Schweiz. med. Wchnschr.*, 1927, **57**: 708.
6. WALLGREN, *Jahrb. f. Kinderheilk.*, 1927, **117**: (third ser.) 313.
7. SYMES, *Tubercle*, 1930, **11**: 154.
8. LANDAU, *Arch. Dis. Child.*, 1932, **7**: 77.
9. CRUISE, *Canad. M. Ass. J.*, 1932, **27**: 603.
10. CUSHING, personal communication.
11. Osler's Principles and Practice of Medicine, 11th ed., D. Appleton and Co., New York, 1931, p. 210.
12. MOON AND STRAUSS, *Arch. Derm. & Syph.*, 1932, **26**: 78.

similar organisms were found in sections taken from the human lesions and from the lesions produced in the inoculated animals. For their organism the authors suggest the name *Corynebacterium cutis-nodosæ*. Confirmation of these findings will be awaited with interest.

Much evidence has accumulated to date which goes to support the view that erythema nodosum is, in most cases at least, closely related to tuberculosis. Cruise (*loc. cit.*) has marshalled some of the facts. Vetleson found that 26 per cent of his patients with erythema nodosum had tuberculosis with clinical signs; Massini noted that 14 out of 29 cases of the affection had tuberculosis. Wallgren reported an outbreak of erythema nodosum in a group of 34 young girls who had been exposed to a case of open tuberculosis. Eight weeks thereafter 12 of the children developed erythema nodosum. Two months later all reacted to tuberculin; of 31 x-rayed, 13 showed definite pathological and 4 suspicious shadows at the hilum. Of the 12 cases with erythema nodosum 6 showed hilar shadows and one was otherwise suspicious of tuberculosis. Landau, of Gothenburg, reports an outbreak of erythema nodosum in 4 out of 31 girls, aged from 11 to 12, who had been exposed to a case of open tuberculosis occurring in one of the members of the class.

Prof. Harold Cushing, of McGill University, in a clinical address given recently before members of the American College of Physicians, brought forward many suggestive facts tending to establish the same conclusion. He remarked on the frequent appearance of erythema nodosum among nurses, who are probably more exposed to infection with tuberculosis than are other persons, and he had also seen the affection in medical students. In the cases of children admitted to the Children's Memorial Hospital, Montreal, all those who were the subjects of erythema nodosum were found to exhibit typical signs of tuberculosis in some form or other. Some of these children developed pleurisy. One child who had had tonsillitis and two attacks of erythema nodosum died with tuberculous meningitis; one other died with miliary tuberculosis. Another child had a "cold," with rhinitis; erythema nodosum developed, and an enlarged lymph node appeared in the neck, which was hard and persisted, and the peribronchial nodes were found by the x-ray to be enlarged. This child got another "cold," and the erythema came on again. One child, six months after an attack of erythema nodosum developed Pott's disease, and one other had hæmoptysis.

Although the accumulated evidence seems to prove that tuberculosis is the cause of erythema nodosum in many instances, yet cases occur in which this explanation does not hold. For instance, W. R. F. Collis[13] points out that not all cases of erythema give a positive tuberculin reaction. He found that some of his cases, negative to tuberculin, gave strongly positive skin reactions with a toxin derived from a hæmolytic streptococcus which he believes to be the specific organism cause of acute rheumatism. In the light of these and other findings one may safely conclude that erythema nodosum may follow upon any one of several forms of infection, and, presumably, is an allergic phenomenon. It is, therefore, not a disease entity, but rather a symptom-complex. Collis defines erythema nodosum as a type of hyper-reactive tissue response to different bacterial allergens. Some broad generalization of this kind seems to be necessary to account for all the cases. It is clear, at any rate, that some of the epidemics recorded have been traced to a "carrier" of the tubercle bacillus, as in Landau's cases, while others, logically may be attributed to association with a "carrier" of a hæmolytic streptococcus. A few may be dependent on an assortment of other infections. Incidentally, one might refer to the view put forward by Poncet in 1896 that a proportion of the cases of acute, subacute, and chronic rheumatism are really tuberculous in nature, and Bezançon, Weil, Delarue and Oumansky[14] have proved this possibility beyond cavil. This, however, only complicates the matter a little more, and, as Kipling would say, "is another story." A.G.N.

13. COLLIS, *Quart. J. Med.*, 1932, 1 (new series): 141.
14. BEZANÇON, WEIL, DELARUE AND OUMANSKY, *Presse Médicale*, 1932, 40: 641.

THE HEALTH COMMITTEE OF THE LEAGUE OF NATIONS

THE Health Committee, which is the advisory body on all health matters to the League of Nations, was convened in Geneva in October, 1932. This, the nineteenth session, was under the presidency of Prof. Th. Madsen, Director of the State Serum Institute, Copenhagen, and was attended by nineteen other members, besides others specially interested in the work.

The wide scope of topics considered will be best understood by reference to the agenda of the meeting, which were as follows:—

1. Report of the Medical Director on the work of the Health Organization since November, 1931 (and Budget for 1933).
2. Assembly Decisions.
3. Report of the Medical Director on his mission to China (August to December, 1931).
4. Council's Reference to the Health Committee of certain proposals of the committee on Liberia.
5. Report of the Malaria Commission:—
   (*a*) Results of the Meeting of Experts on the standardization of "Totaquina".
   (*b*) Report on Professor Ciuca's Mission to the Far East.
   (*c*) Malaria Courses in Europe and at Singapore: Award of the Lothian Scholarship.
   (*d*) Progress of Co-ordinated Studies.
   (*e*) Program for 1933.
   (*f*) Award of the Darling Prize.
6. Report of Experts on the standardization of certain methods used in making dietary studies (Rome, September 3rd and 4th, 1932).
7. Report of the Expert Conference on the standardization of sex-hormones (London, July 30th and August 1st, 1932).
8. Opium:—
   (*a*) Report of the Commission of Experts on the standardization of methods of estimating the percentage yield of morphine from various kinds of raw opium (held at The Hague on July 11th, 1932).
   (*b*) Memorandum on Dr. Wolff's Report on modern methods of treating drug addicts.
   (*c*) Request of the Permanent Central Opium Board for an opinion regarding a proposed method of estimating the normal consumption of narcotic drugs in various countries.
   (*d*) On May 18th, 1932, the Council decided to request a Committee (consisting of the President of the Office International d'Hygiène Publique, the Chairman of the Opium Advisory Committee and the Chairman of the Health Committee's Opium Commission, together with the legal adviser of the Secretariat) to consider a question raised by the British Government regarding a decision taken by the Health Committee under Article 8 of the 1925 Convention, by which, at the request of the German Government, sterilized solutions of morphine and atropine delivered in 1.1 c.c. ampoules have been exempted from the provisions of the Convention. The British Government raised the question whether this exemption is in conformity with the terms of Article 8 of the Convention.
   (*e*) Heroin Pills. The Health Committee has been invited, on the report of the Advisory Committee, to study the physiological effects resulting from the habit of smoking heroin pills.
9. Sanitary Conference of Chief Health Officers of certain African administrations (Cape Town, November 15, 1932).
10. Report of the Reporting Committee on Tuberculosis.
11. Report of the Reporting Committee on Venereal Diseases.
12. Study of Medical Education.
13. The Effect of the Present Crisis on Public Health.
14. The study of deafness.
15. Investigation into the problem of popular nutrition in Chile.
16. Collaboration with the Ministry and the Institute of Hygiene of Czechoslovakia.
17. Miscellaneous.

One of the most interesting and significant discussions during the progress of the meeting

was that which resulted from the presentation of the report of the Committee on Tuberculosis. This dealt with the general principles of prophylaxis in this disease. The report itself, prepared by Prof. E. Burnet, of the Pasteur Institute in Paris, was most comprehensive and illuminating. It first emphasized that tuberculosis is essentially a social disease and that the campaign against it is an undertaking of the first magnitude in the general field of social hygiene. It was reiterated that a review of the epidemiology and a study of the incidence, as judged by statistical records of mortality and morbidity, suggest that the death-rate from tuberculosis in perhaps the majority of European countries began to decline prior to the discovery of the tubercle bacillus. Although this fall in the death-rate has been more or less regular, beginning at different dates in different countries, and has proceeded ever since, it has really been an accompaniment of social progress everywhere. The organization of anti-tuberculosis measures in general followed the initiation of the decline. The Committee believe that improvement in general nutrition of the people, more satisfactory housing, and a raising of the general level of education, as well as the evolutionary progress in the science of medicine, may all be regarded as causal factors in this decline.

The emphasis on the importance of social insurance as an auxiliary of the greatest possible value in anti-tuberculosis efforts in European countries may come as a surprise to physicians and to the general public in this country. The Committee expressed its views on this question in the following terms:—"The influence of social insurance in the anti-tuberculosis campaign is becoming greater and greater. Such insurance is becoming a great economic and social force, and hygienists should do their utmost to stimulate its preventive trend. This implies participation of the medical profession which should be orientated towards prevention. This in turn requires that medical education shall be given a new trend."

All the usual features of a general character in the modern anti-tuberculosis program were considered at length. Very especial importance was attached to the rôle of the dispensary in the anti-tuberculosis movement. In the view of the Committee the scope and function of the dispensary may have to be extended to provide certain forms of ambulatory treatment, such as collapse-therapy and, in suitable cases, chrysotherapy.

Considerable difference of opinion in the Health Committee became evident in a discussion of the subject of BCG. This method of specific prevention through vaccination, while it has been adopted in some countries, has not as yet met with world-wide acceptance or approval. The majority of the Committee were of the opinion that in countries where close supervision and scientific direction could be given the use of BCG was justified. To give effect to this it would seem that residential institutions might best provide suitable groups for the study of its value as well as its limitations. It can hardly be said that any new or extended trial of this prophylactic is likely to follow the rather lukewarm commendation of public health experts from countries where BCG has not as yet been employed.

The importance of post-sanatorium care and follow-up were very especially emphasized, as was the significance of the training of public health nurses, the necessity for early recognition of cases of the disease, and the prevention of bovine tuberculosis by the general use of pasteurized milk. This report is available as a separate document and its perusal will repay those who take the trouble to read it.

A lengthy discussion on the effect of the prolonged economic crisis upon the public health took place. Certain procedures were elaborated by which it is hoped that it may be possible to arrive at some tangible and definite conclusions regarding this matter. It is proposed to attempt, through a study of statistical data, through surveys, and by other means, to obtain information which may be found suitable for comparison and critical appraisal. These investigations are proceeding at the present time. As has been customary in recent meetings of the Health Committee, valuable and important information relating to the world-wide problem of malaria incidence and control was brought to the attention of the meeting by the commission entrusted with the task of

reporting the progress of the campaign against that disease. Opium and narcotic drugs constituted another important subject of discussion.

A sanitary conference of Chief Health Officers of a number of African public health administrations was arranged, and at this meeting the control of yellow fever and other grave menaces to the public health of peoples, not only of African countries but of other communities in the Far East was considered. Various other matters of interest and importance in the international public health field received attention during the course of the nineteenth session which, from many points of view, was one of the most important meetings held in recent years.

J. C. F.

Editorial Comments

The Deliberate Opening of Bones as a Treatment for Rheumatoid Arthritis

Dr. J. Forbes Mackenzie, of Melbourne, Australia, points out* that a preliminary report on this method of treatment was published by him in the *Medical Journal of Australia,* on April 11, 1931. This earlier communication concerned the extraordinary improvement in the condition of an elderly woman, the subject of chronic rheumatoid arthritis, following a fracture of her femur. It occurred to Dr. Mackenzie that by the deliberate opening of bones so as to imitate a fracture some benefit might come to sufferers from chronic arthritis. Attention is drawn to the probability that this so-called rheumatic or rheumatoid arthritis is really an osteitis of a chronic character, and that the joint manifestations are secondary. The writer did not feel called upon here to indulge in theory regarding the etiology of the disease or the reasons for the striking and certain relief from pain that this procedure undoubtedly affords. All he says is that certain relief from pain can be guaranteed, not only from that felt in the joints near where the bone has been opened, but also in all other parts of the body that are affected. Thus in a case in which only the femur and tibia on each side were opened, relief from pain in the arms and shoulders has been obtained; a boy aged ten years, fourteen days after operation obtained relief from pain in his neck and was able to turn his head in any direction. His neck had been stiff for months, and any attempt at movement made him cry. Dr. Mackenzie's paper is summarized as follows:—

"The making of openings in some of the large bones has a curative effect on the condition known as rheumatoid arthritis. Manifestations of the curative effect are: (a) relief of pain; (b) improvement in the well-being of the sufferer, manifested by a most striking improvement in the red cell count; an increase of 100,000 per cubic millimetre in a fortnight is common and usual; an increase up to 700,000 in that time has been noted; in one case an increase of 1,000,000 in one month was found; (c) improved functioning of the limbs, probably due to the relief from the pain which previously accompanied any movement."

Dr. Mackenzie has operated on nineteen patients, in all of whom rarefaction of the bones had been noted, accompanied by undoubted evidence of decalcification and a very marked fatty degeneration of the bone-marrow, which flows from the openings made in the bones like thin motor oil. The earlier the case, the less thin oil is found. The bones chosen for opening were the femur and the tibia. Both legs are operated on, the lower end of the femur on the antero-lateral aspect being the most convenient site, and the upper end of the tibia on the antero-median aspect. Three-quarter inch trephine openings are made, and sometimes enlarged. The main point to be emphasized is that the opening in the bones should be sufficiently large; small drill holes are not sufficient. The opening is made right into the marrow cavity, and some of the cancellous tissue is always scooped out, more or less space being left, the whole idea being to bring about a state of decompression. This cancellous tissue is practically always found to be more like dried sponge than like true cancellous bone. The tibia and femur are always chosen, regardless of whether the knees are affected or not, and the opening into the bone is made on both sides of the body. Should the hip be affected, the neck of the femur is drilled to the size of the little finger, aiming to reach the spot where the neck joins the head. When wrists are affected, a smaller drill opening is made into the lower ends of radius and ulna. For enlarged knuckles, drill holes are made into the distal ends of the metacarpal bones. The same procedure is adopted for arthritis of the great toe, the metatarsal being drilled near the affected joint. A general or spinal anæsthetic is advised when operating on the larger bones; drilling can be done under a local anæsthetic. Culturing the bone-marrow has yielded negative results. Early

* *The Med. J. of Australia*, 1932, **2**: 690.

movement of the limbs in bed is encouraged, and after a month the patient is allowed to sit on the edge of the bed and dangle the legs, but no weight-bearing is permitted for two months.

This novel procedure, originated by Dr. Mackenzie, will no doubt be followed by many surgeons, and the hopelessness, otherwise, of the condition of so many sufferers from chronic arthritis will prompt them to undergo the treatment. The theory advanced, that chronic arthritis is but the joint manifestation of a disease originating in the interior of the bone, is most interesting, and is supported by the findings of fatty degeneration in the medulla and of a cancellous tissue like dried sponge. Sir Robert Jones, whose untimely death was reported only a few days ago, used to advocate trephining bones which were affected by osteitis deformans, with a view to decompression and relief of pain. Dr. Mackenzie is to be highly commended, not only for his observation of the relief of chronic arthritis following fracture of a femur but for his originality in turning this observation to such good use. One cannot forget that the surgery of the sympathetic system was originated by his fellow-countrymen, Drs. Hunter and Royle, with ever-increasing benefit to humanity. We all hope that Dr. Mackenzie's contribution to the relief of chronic arthritis will prove of equal importance.

J. A. NUTTER

The American College of Physicians in Montreal

Montreal has witnessed, within the past month, the annual meeting (the seventeenth) of the American College of Physicians. This is the first time the College has met in Canada, and whilst we cannot speak for previous meetings it will probably be agreed that this was quite as successful as any other. It has been held in other cities which undergo winter weather, but in none perhaps in which the winter so completely failed to wear its typical garb. This, however, was a detail of little consequence. The program was largely contributed to by the staffs of the local hospitals, and whilst it was quite impossible for anyone to attend more than a fraction of the meetings and clinics, one gathered from random sampling that the papers and demonstrations were of a very high order. The local organization gave the highest proof of its efficiency in its smooth and unobtrusive functioning under the chairmanship of Dr. Meakins. We congratulate him most heartily on his being chosen as the President-elect, and the College on their discernment in choosing him.

We have welcomed the College. We now look forward to the time when we may again act as their hosts.

H.E.M.

The Canadian Medical Protective Association

The Canadian Medical Protective Association fills an important niche in our medical edifice, and yet, perhaps, its work is hardly appreciated enough by the profession at large. This, no doubt, is due to the psychological fact that, as with most forms of insurance, each one of us expects to be the lucky one who escapes damage. We are willing to take a chance.

For thirty-one years, under the able hand of its president, Dr. R. W. Powell, of Ottawa, the Association has advanced from modest beginnings until now it has become a highly efficient and beneficent agent in the medical body politic. It is well to note that not only does this Association pay the costs of any action brought against its members, but arrangements have recently been completed to pay damages as well, when assessed, to an unlimited amount. In the light of this statement one wonders why any member of the profession fails to place himself under its protective wing. The degree of protection afforded is great but the cost is not great—only five dollars per annum. This small expenditure, while hardly felt, may give returns in the thousands. Who will say it may not? No medical man can be sure that he may not at some time be dragged into court on some frivolous pretext, and actions for malpractice seem to be on the increase. It would seem, therefore, the part of wisdom to fortify ourselves with the aid that the Canadian Medical Protective Association can afford. Even if most of us never need to call upon this aid, yet we can, by becoming members of the Association, have the satisfaction of knowing that by so doing we have been able to help some less fortunate brother. Why not join at once? The Association needs you. Write to the Secretary-Treasurer, Dr. J. Fenton Argue, 116 Nepean St., Ottawa.

A.G.N.

The Bulletin of the Ontario Medical Association

We have before us the first number of the *Bulletin of the Ontario Medical Association,* and welcome its appearance. For some years certain of our Provinces have been issuing bulletins dealing with matters of local interest, notably, Nova Scotia, Manitoba and British Columbia, and now Ontario falls into line.

These provincial bulletins have a distinct place in medical journalism. They can disseminate information of a medical, legislative and personal character, as well as news, which, from its peculiar local appeal, can scarcely find a place in the larger medical journals. They can also record the debates and express the opinions of the provincial Associations in a convenient and accessible form, without the possi-

bility that such matter will be lost in a welter of scientific, clinical and historical articles.

The present issue of the *Ontario Bulletin* begins with an informative article on Medical Relief and an important statement relating thereto from the Board of Directors of the Ontario Medical Association. The official tariff of medical fees is also given. Medical legislation in so far as it relates to the Drugless Practitioners Act is discussed, and there are a number of letters from the District Counsellors, all giving the wise and timely advice that medical men not already members of the Ontario Medical Association should join that body at once, for their own sakes. The very future of the medical profession is in the balances at the present time and what will eventuate depends very largely on concerted action. Under existing circumstances no one can afford to be playing a lone hand.

While we have nothing but praise for the desire of the various provinces to ventilate their ideas and record matters relating to medical life within their own bounds we would deprecate any tendency to expand the provincial Bulletins to the measure of a medical journal. There are too many journals now. To inflict a new one on a long-suffering medical constituency requires that one should, as the lawyers say, "show cause," and in these days of journalistic plethora that cause must be impeccable.

A.G.N.

Retrospect

ASTHMA AND HAY FEVER

BY T. G. HEATON,

Toronto

Modern specific methods of diagnosis and treatment of asthma and hay fever really date from Noon and Freeman's work in England in 1911. Since then no new principles have been discovered, but a tremendous literature has elaborated what was then less accurately known.

ETIOLOGY

Heredity.—A family history of allergy is found in about 9 per cent of normal persons[1] and in from 25.2 per cent[2] to 91.6 per cent[3] of allergics. The inherited quality is an ability to become specifically sensitive to *something* and is transmitted twice as frequently through the female as through the male.[4] A bilateral family history results in an increased tendency for symptoms to develop in the first decade of life.[1] Inherited sensitivity may express itself by different symptoms from those manifested by the former generation, but there is some tendency to the independent transmission of asthma and hay fever.[4]

Age.—Over 80 per cent of cases of asthma begin under 40 years of age; and about 33 per cent before the age of 10.[5] The earlier in life an individual becomes sensitive, the greater the tendency to multiple sensitivity.

Sex.—The sexes in general are equally affected, but males predominate before puberty.[5]

Incidence.—Of the population of the U. S. A. 1 per cent has hay fever,[6] and of conscripted Americans 0.25 per cent had asthma.[7]

Race.—American Indians are said to be relatively immune.[8] Does this apply to other primitive races?

Climate is chiefly of importance in asthma and hay fever in relation to the prevalence of allergens. Ragweed cases will be free of symptoms in Europe where the plant does not grow.

Congenital hypersensitivity may occur as a result of hypersensitivity transmitted from the mother to the fetus in utero.[1] Infants may become sensitive to an article in the diet of the nursing mother or of the cow.[9]

Lesions of the nose and throat may act as reflex causes of asthma, or may be due to the allergic condition which causes asthma or hay fever. A vicious circle may so be formed.

Irritation of the respiratory passages by non-specific factors may precipitate attacks of asthma and hay fever.

Rôle of the vagus and sympathetic nerves.—Bronchoconstriction may be produced by stimulation of either the vagus or sympathetic nerve supply.[10]

Tuberculosis.—The incidence of tuberculosis among asthmatics is higher than among the population in general.[11] Miliary tuberculosis may present asthma as a symptom. Except for this, it is unlikely that tuberculosis can cause asthma.

Acute infections.—Asthma may be initiated by whooping-cough, measles, scarlet fever, recurrent bronchitis, unresolved pneumonia and influenza. And asthma is frequently relieved for some time, and even permanently, by an intercurrent pneumonia, pleurisy or other febrile illness.[12]

Reflex causes of asthma.—Any normal or abnormal condition that tends to disturb the function of an organ may play a part in the etiology of asthma. Psychical trauma, conditioned reflexes, and emotional instability are important factors.

Foreign bodies in the trachea or bronchi may cause typical asthma.[13]

Specific allergens in asthma and hay fever.—In the case of true hay fever, it is usually held that all such cases are due to specific sensitivity to some allergen. The inhaled allergens are the

most important group. In asthma the diagnostic problem is usually more difficult. The incidence of positive skin tests in asthma is given at about 49 per cent.[14] Many believe that this percentage will be greatly raised as knowledge improves. The multiplicity of antigens proved to have caused asthma suggests this may be a reasonable belief. It is impossible to detail all antigens here. But a list of *classes* of antigens follows: pollens, animal epithelials (fur, feathers and dander), insect epithelial products[15] (apparently more important than would be imagined), vegetable fibres, fabrics, fungi, moulds and rusts, house dust, orris root, foods, and a large miscellaneous group generally related to unusual occupational exposure (*e.g.* boxwood among jewellers).

Bacterial allergens.—Many writers do not believe that hay fever or asthma can be caused by hypersensitivity to bacteria resident in the body of the patient. Two articles however give this type of bacterial allergy strong support.[16],[17] Those who believe in bacterial allergy class many of their non-skin-sensitive asthmatics as "bacterial" or "intrinsic" asthma.

Fractional allergens.—A patient may not be sensitive to whole wheat, but may be sensitive to *one* of the 5 known proteins of wheat. Similarly, occasional cases are non-sensitive to a whole pollen, but react to a fraction of this pollen.[18] This greatly increases the difficulty of accurate diagnosis.

Influence of exposure to allergens.—Patients may first develop symptoms when exposed to unusually large amounts of an allergen, and symptoms may then recur on exposure to smaller amounts. Exposure generally determines the antigens to which a patient will become sensitive.[1]

The incidence of asthma in hay fever patients is variously given at from 25[19] to 65 per cent.[20]

"Balanced allergic state".[21]—When the patient is symptom-free he is not necessarily cured, but probably only in a favourably balanced state in which it is the aim of his physician to maintain him by a careful manipulation of specific and non-specific factors.

DIAGNOSIS

The diagnosis of true bronchial asthma presents certain traps. One must exclude any lesion which may obstruct the larynx, trachea, or bronchi from without or from within; various chronic pulmonary lesions; hysteria; cardiac asthma and other rarer lesions.[22] The complete diagnosis in asthma therefore requires a history taken carefully, having the etiological factors in mind; an examination of the lungs, heart, upper respiratory passages, urine and blood pressure; if possible a fluoroscopic examination of the chest as routine, often an x-ray of the chest and nasal sinuses, and appropriate skin tests. If no etiological factor can be found to explain the asthma, bronchoscopy may discover a non-opaque foreign body.[23] When the nature of the attack is in doubt a therapeutic test with adrenalin or ephedrin may be of value.

Seasonal hay fever presents little difficulty in the non-specific diagnosis. In other forms of vasamotor rhinitis, itching of the mucous membranes of the eyes, nose, roof of mouth, or posterior pharyngeal wall is considered a pathognomonic manifestation of specific hypersensitivity.[24] The diagnosis should be based on the history, skin tests, and examination of upper respiratory passages, possibly with the aid of the x-ray. The history is of great importance in specific diagnosis if combined with an accurate knowledge of local pollen plants and seasons.

How many skin tests should be done in asthma and hay fever?—The skin tests should be based on the history, a knowledge of local flora, of the habits of the patient, and on knowledge of the relative importance of the various antigens which can be gained only by experience. This relative importance will vary from place to place and from time to time. Stock dusts and orris root should be used in every case of both diseases.[25] Most allergists use the scratch test as their routine method, but employ the intradermal technique in special circumstances. There is no theoretical limit to the number of tests to be done where all clues fail.

Interpretation of skin reactions.—Any reaction larger than the control is read as positive if it can be repeated. Negative tests do not disprove sensitivity. Positive tests may represent past history rather than present state. The specific diagnosis must be established on *two or more* of the following *clinical* grounds:[26] (1) production of symptoms on exposure to the suspected material; (2) occurrence of symptoms of asthma or hay fever after diagnostic injection; (3) disappearance of asthma or hay fever after specific treatment by injection, or (4) after avoidance of the suspected material.

Multiple skin reactions are the rule rather than the exception. In such a case a sensitivity to, say, house dust may give trouble all the year round, or only during the season of the pollen to which the patient is also sensitive. Here desensitization to either antigen will fail; desensitization to both will be successful.[27] On account of a tendency to develop new sensitivities, retesting is often wise in future years. *Passive transfer* of skin sensitivity is a method sometimes of value in proving sensitivity.

Diet diaries and elimination diets.—Skin tests with foods often bear false witness. Food sensitivity may have to be diagnosed by exposure tests.[28]

Urinary proteose in allergic diseases.—This substance is said to be increased in attacks of asthma and hay fever and in other conditions and, contains the specific substance to which the patient from whom it is obtained is skin-sensitive.[29] Desensitization with this material may be possible. No confirmation of this work has yet appeared.

Atypical respiratory allergy.—Cases of chronic dry cough, sometimes associated with hæmoptysis, with a family history of allergy, and usually

wheezing breathing at some time, have been shown to be due to allergy.[31]

Complications.—Spontaneous pneumothorax, chronic bronchitis, bronchiectasis, emphysema, any of the other allergic diseases, massive collapse, and partial atelectasis.[30]

PROGNOSIS

Asthma beginning in childhood has a strong tendency to clear up before the age of 20,[32] except where there is a definite family history of asthma. "Of every 100 asthmatics at any age it would appear that 7 females and 8 males are transferred to a non-complaining category every year".[33] Asthma with onset at middle age will probably persist for life.[34] Chronic bronchitis, emphysema, bronchiectasis, and prolonged asthmatic attacks are unfavourable. If an exciting cause can be demonstrated the prognosis is better. Pollen asthma frequently ceases after 45 years of age. Death in an asthmatic attack is unusual, but not rare.[35]

The spontaneous cure of hay fever is rather infrequent.[19] The incidence of asthma in hay fever cases has been mentioned and is an argument for the persistent specific treatment of hay fever. Deafness may be a sequel to hay fever.

TREATMENT

In a paper of this length it is impossible to discuss individually all the remedies mentioned. An attempt will be made to group them in a helpful way.

Reliable remedies.—Adrenalin is the stand-by during an asthmatic attack. Its effect may be prolonged by massage of the inoculation site even an hour or more after inoculation. Ephedrin: the initial dose should not be over gr. ¼ per os. It will contract the nasal mucosa when given orally.[36] Morphin is very useful in severe asthma, but should, of course, be used with great circumspection in so persistent a disease. Ether and chloroform. A valuable method for checking cases of "extremely severe, constant and prolonged asthma" by means of ether per rectum is given.[37]

Somewhat less reliable are the antispasmodic drugs (atropine, asthma powders, benzyl benzoate, amyl nitrite), felsol, iodides, the induction of vomiting.

Relatively ineffective are, sodium iodide intravenously,[38] treatment by acid or acids and digestive ferments,[39] treatment by various combinations of phosphorus, calcium, ergosterol, thyroid, and parathyroid extract or, ultraviolet light,[40] other forms of physiotherapy,[34] cold storage treatment,[41] blood transfusion[42] cocainization of sphenopalatine ganglia,[43] "non-specific desensitization" with foreign protein[44] including autohæmotherapy,[45] oxygen and carbon-dioxide inhalations,[39] special diets.

Remedies recently recommended which may be of value.—X-ray therapy; (an article worth reading is[46]); urinary proteose therapy;[29] powdered glucose and ammonia in the form of sal volatile (this method comes from England[47]), tuberculin therapy,[19] bronchoscopy and aspiration of secretions.[66]

Hygienic measures are of the greatest value in the opinion of all in both asthma and hay fever. Mental, physical, environmental, and functional aspects should all be considered. In spite of a variety of special diets that have been urged, no clear indication for special diets exists aside from specific hypersensitivities. The diet in asthma should be well balanced, light, and the heaviest meal should be taken at mid-day if attacks occur frequently at night.

Vaccines are admittedly of some value. Many find stock vaccines as good as the autogenous. The results are never remarkably good.[45]

The specific surgical treatment of asthma generally consists in an attempt to interrupt the vagus and sympathetic nerve supply to the bronchi in whole or in part. An analysis of carefully reported and followed cases showed failure in half and varying degrees of improvement in half, including a few brilliant cures in cases considered hopeless.[48]

Surgery of the nose, throat and teeth.—Tonsillectomy seems rarely to assist in curing asthma or hay fever.[5] Removal of adenoids causing obstruction may benefit. The removal of infected teeth will seldom or never cure asthma.[34] The earlier writers' reports of intranasal surgery in asthma and hay fever are generally discouraging,[51] though occasional cures undoubtedly occurred. More recent writers have urged more radical surgical procedures and claim better results—at times in the opinion of the reviewer, extravagant, *e.g.*—complete cure of asthma in 74 per cent and marked improvement in 26 per cent of those operated on.[50] On the other hand, many claim that the nasal lesion is the result of allergic reaction and urge specific medical treatment before surgery, *e.g.*, "Our patients have had full asthma and hay fever relief in the presence of chronic sinusitis, abundant polyp formation, tonsillar and abdominal disease".[52] The decision for operation must be an individual one for each patient, and operation should be avoided as long as exposure to the offending allergen continues.

SPECIFIC TREATMENT

"Experience has demonstrated that grass-pollen-sensitive cases occurring in New York can be satisfactorily treated by the employment of a single extract, *viz.*, Timothy".[53] It has been shown, however, that the various pollens do differ antigenically, though many have factors in common[54] and cases have been reported in which trial has proved the necessity for strictly specific desensitization. Strictly specific desensitization means complete testing with all likely pollens and the use, in all probability, of two or more of these in treatment.

Nearly all writers recommend seasonal as well as pre-seasonal treatment. The former alone is worth while if the patient comes too late for the latter. Many use a weekly interval, but daily

or even twice daily injections are practised. Pre-seasonal treatment may start from 2 weeks to 3 months before the pollen season, generally nearer 3 months than 2 weeks. A high total dosage is desirable. Variations not likely to become popular are: intradermal injections;[55] perennial treatment;[56] oral desensitization;[57] local nasal desensitization by spray or ointment.[58]

Black treated 62 ragweed sensitive patients with a protein-free extract of giant ragweed. The results were as good as with ordinary extracts.[59] An interesting literature is growing which suggests that an active principle in certain of these extracts is non-protein and possibly carbohydrate in character.

Constitutional reactions occur in about 10 per cent of cases and have on rare occasions proved fatal.[60] They have the effect of weakening such immunity as has been built up. Local reactions are frequent, but are not harmful and may be beneficial.[61]

In regard to the results of specific desensitization treatment extremes are shown for each disease.

Disease	*Ref.*	*Date*	*No. of patients*	*Complete relief*	*No relief*	*Intermediate*
				Per cent	Per cent	Per cent
Hay fever	62	1923	2,684 (pooled from several authors)	12.8	16.5	71.7
Hay fever	63	1928	30	100	....	....
Asthma	32	1930	177	35	4	61
Asthma	64	1926	110	68.3	2.7	29

The treatment of asthma and hay fever by the avoidance of allergens is the method of choice when it can be effected. Allergen-free rooms have become a valuable therapeutic weapon,[65] and air-filters can be installed in the home for no great price. Treatment by avoidance is the usual method in food sensitivities.

CONCLUSIONS

Certainly asthma and hay fever are difficult to cure. Certainly, too, specific methods can help many at any age. In unexplained cases of chronic cough, respiratory allergy should be kept in mind. An increasing number of specialists in allergic diseases is arising, and the complexity of the subject would seem to justify their existence, at least for diagnosis.

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MEDICAL JOKES IN "PUNCH".—The exhibition of prints depicting humorous situations between doctor and patient now in progress at *Punch* offices in Bouverie Street, E.C., was first arranged for the centenary celebrations of the Association this year, and was attended by many members and delegates. The selection begins in the middle of last century, and is brought down to the present day. Some of the earlier jokes are still appropriate nowadays; one, which appeared in 1869, concerns the treatment of nervous depression, and the legend runs: "It's very well to go down for six weeks into the country by yourself, to give up tobacco and stimulants, and to live the Whole Day, so to speak, in the Open Air, but all this will do you no good unless you cultivate a Cheerful Frame of Mind and take a Lively View of things." The picture shows the patient standing alone under an umbrella in a dripping landscape, gazing mournfully at a couple of ducks in a pond. Another unchanging grievance of the patient is chronicled in the same year: "'Medical attendance two-and-six'! Why, I attended *him* and had to wait two hours." Sixty years later George Morrow imagined for us an entertainment at which he has never assisted: "Competition Night at the Pharmaceutical Society," where competitors are deciphering the calligraphy of eminent members of the British Medical Association. For the most part Mr. Punch has treated our profession with kindliness and sympathy, and we look forward to his genial criticisms in the future.—*Brit. M. J.*, 1932, **2**: 1042.

Special Articles

THE MEDICAL CURRICULUM AS VIEWED BY A COUNTRY GENERAL PRACTITIONER

BY H. R. CLOUSTON, B.A., M.D., F.R.C.P. (C.),

Huntingdon, Que.

"Experience has shown that more than 80 per cent of all the ailments for which people seek medical aid can be treated most cheaply and most satisfactorily by a family physician with what he can carry in a handbag."[1] This estimate can be raised to 95 per cent with the equipment many physicians possess. Any violation of the laws of efficiency and economy will bring inevitable retribution. The one significant thing about the American Committee on the Costs of Medical Care is that the public was willing to spend a million dollars to find out if the costs were too high, and why. Failure to give reasonable service at reasonable rates merely means a resort to self-medication or the cultists. The "divine right" of the Medicine Man in Canada disappeared with the tomahawk and the scalping-knife. The position of the city family physician is quite secure, and when he needs help it is at his call around the corner. In the country, on the other hand, there are distances and transportation difficulties to take into account. Some day, perhaps, the carpet of Aladdin will be available in the mail-order stores. Until then the One-man Clinic, strategically placed, must remain indispensable. *The efficiency and adequacy of the country general practitioner must be the tests of Canadian medical education.*

In times not far past the Faculty had members with a background of experience in country general practice; their influence is probably responsible for conditions which have been generally satisfactory. The maintenance of the excellent record is at once the duty and the problem of the medical schools. The ever-present danger is that new Pharaohs may arise who know not Joseph, who cannot visualize conditions outside a hospital, and here, as ever, "where there is no vision, the people perish." Occasionally we hear that some of those in power openly declare that they do not consider it any part of their duty to turn out "practical" men. If that is actually so, the prospective student, the public, and the benefactors should be made aware of it. Their viewpoint is that all the graduate needs is the application of "horse-sense". On the other hand, many of the graduates feel so keenly on the subject that they urge that after graduation a man should serve for a period as an apprentice to a veteran. It is the old situation described by Kipling:—

> The toad beneath the harrow knows
> Exactly where each toothpoint goes;
> The butterfly upon the road
> Preaches contentment to that toad.

As a general practitioner, the son of a general practitioner, I can readily appreciate the great assistance which I received by watching my father's methods. Nevertheless, a system of apprenticeship would present many difficulties and defects. It would be unnecessarily wasteful in both time and money. It would be difficult to find a sufficient number of willing veterans, and, if places were found, there would be no equality of teaching and no supervision. As a real solution of the problem a system of "liaison officers" should be established between the collegians and the practitioners—men whose duty it would be to maintain a proper perspective. One or more country physicians should be brought to the medical school to inspect, make suggestions, and propound problems. They could demonstrate their equipment and any special methods applicable to the rural sections. And, conversely, appointment to a teaching position should be contingent upon some study of the needs of the outlying districts. The instructor in the warfare should have at least one glimpse of the "front-line trenches." These liaison officers should function whether there was to be a hospital year or not. They would be of value in directing the graduate what to look for in that year.

Why do all men not have a hospital year following graduation? Certainly the patient-contact and the experience of doing things is highly desirable. The first reason is because of the time and money already spent. The second reason is that there do not seem to be enough internships to go around. Thirdly, as presently organized, there is almost no place for the would-be general practitioner in the hospitals. If the future general practitioner is to receive the full benefit of a year in hospital he must work not in one or two but in several departments; he could not spend more than two months in each. But one of the things that whiten the hair of the staff is breaking in housemen. A too-swiftly rotating system would be intolerable for the chief and bring chaos to the hospital, and would be grossly unfair to the patients. My first experience as an intern was as the sole one of the ward. My first day coincided with the coming to the ward of a head nurse who has since become the highly esteemed matron of a hospital. There was an average rise in temperature of one degree all around the ward the first day! It would seem possible to overcome both the over-supply and the disturbances from changes by devising some means of adding the extra number of interns to the present ones who are willing and ready to spend six months or a year in the service. To compensate the senior interns for guiding the

two-month men in the routine, these seniors would have more time for study and contemplation than the rush allows them now. If there were only two short-term men in a service their terms could be arranged so as to cause the least possible annoyance to the staff.

One of the problems of almost national importance is the provision of medical care in certain rural areas. Occasionally someone (perhaps highly placed in the profession) comes forward to urge a shorter and cheaper course for a certain number as a cure. Such a suggestion is based on a complete misconception of the situation. Is it not true that the chiropractors and their ilk flourish most in the cities, in the shadow of the colleges and the Medical Arts Buildings? They may make short visits to the country but they do not stay there. Shorten, if you will, the course of the man who undertakes to specialize in some branch and license him only for that branch. Let me make it clear at once that I do not advocate any such thing but if there is to be any weakening of anybody's courses let it be in those of the specialists and then only in the branches which the medical aspirant does not intend to use. Many of us believe that a man will be a better specialist if he has not only taken a full course but has also had some actual experience in general practice. Every one whose practice is restricted to a certain field should have constantly before him the admonition of St. Paul that the whole body is not the eye (or the uro-genital tract) and that when one member suffers all the others suffer with it. But there must not be an inferior course for the man who is to stand alone in the country. He must not be inferior; he must not be thought inferior by college or laity. ("He cures most in whom the people have the most confidence.") He must not, himself, have any more of the inferiority complex than is imposed upon him now. To deal adequately with a general practice a man must be better prepared to cope with problems in *all* the specialties than the average specialist is to deal with any other specialty than his own. Quite frequently he has a greater investment in equipment and books and reads more journals than the man who devotes himself to one branch. The same cubic brain capacity is differently employed and there is no more arrest of mental development in one than in the other. Indeed, in spite of the apparent contradiction in terms, *general practice is a specialty of its own.* When that fact is properly appreciated, inside and outside the profession, great progress will have been made. It should not be necessary to support this position with references to Jenner, Koch, Mackenzie *et al.* It is easy to quote cases of appendicitis operated upon in one-room huts; or strangulated hernia dealt with on the kitchen table after the surgeons had refused operation, when the patient was in health, on account of his age; or the fractured femur well-handled after the x-ray machine had been taken through the snowdrifts and the film developed in the cellar. Perhaps one might tell of the man who outguessed the city hospital when Malta fever was a new diagnosis in the province or of the odd bit of research work. It is all in the day's (and night's) work.

To obtain men for the rural sections you must go where they grow them. Almost invariably the country general practitioner comes from the country or the small town. It is well known that most city-bred men, whether labourers or professional men, are afflicted with a species of agoraphobia. They would rather stand in a group at a soup-kitchen door than cross an open space alone to their own tables. (There are 150 doctors in one city in the U. S. A. in the bread line.[2]) Of course, when the city man becomes well to do he has "a little country place" and becomes most enthusiastic about country life. Therefore to obtain men for the country the first step is to increase the quota of men from outside the city. It will be quite safe to err on the generous side. Not a few of the prominent city men were country-born. Another step would be to find some method of assisting the student with scholarships payable for service. In some areas it may be necessary to subsidize the graduate.

Incredible as it may seem, some men actually prefer country practice. With the majority it is because of the necessity of obtaining quicker self-support. The smaller, but more rapid and certain, return is accepted in place of the larger one later. Fishbein[3] says "When the rewards of the general practitioner and the interest in his work become such that general practice can compete as an attraction with the specialties, more physicians, being human beings, will be general practitioners." The uncorrected financial reward is said to be about 10 to 4. This makes no allowance for the extra time or expenditure or the factor of certainty, or that the specialist with his 10 has more difficulty "keeping up with the Joneses" than the general practitioner has with his 4. In addition there are indications that competition is becoming keener in the specialties and with diminishing returns. As to the potential interest in the work of the general practitioner the usually well-informed editor of the *Journal of the American Medical Association* is very far astray; the scientific variety presented in general practice is unexcelled. The opportunity to observe curiosities is limited only by the power of the practitioner's mind to receive them. As for "human interest," only the parish priest can begin to compete with him.

In the consideration of the requirements for the study of medicine it seems clear that something more than a High School certificate should be exacted. But surely it would be more rational to accept two years of specified studies than to take blindly a B.A. degree without reference to courses. One must never lose sight of the fact that a goodly proportion of the most desirable student material comes from homes where college expenses constitute a real burden. (Osler was a country minister's son.) Any *unnecessary* pro-

longation of the course must be prevented. The most absurd method of selecting students would surely be a "means test." Nor must it be forgotten that the average doctor in America is dead before 65. He dies the youngest of the professional men; yet he graduates the oldest. In spite of this there are those who talk glibly of adding "another year" and "another year" to the curriculum. That extra year is taken from a man's life and it may be the year of his largest income. First, lengthen the scholastic year, if necessary. In some medical schools in the U. S. A. the course is continuous throughout the year. Since the majority of the medical students seem to seek to put in the summer months in a hospital and have apparently no hope of earning during the vacation, one wonders whether the objections to extending the year would come from the students or the professors. Any increase should occur only after the possibility of condensing the course is exhausted. In this respect anatomy may be cited. Let it be accepted at once that the student must be made acquainted with every macroscopic and microscopic feature in the body. Grant also that a certain amount of dissection is necessary. But is there not a considerable amount of dissection which is like the reasons of Gratiano? "As two grains of wheat hid in two bushels of chaff; you shall seek all day ere you find them; and when you have found them, they are not worth the search." There must not be a return to the system of our time, when four hours a day for two years was spent on Anatomy. Let there be a more extended use of prosectors, more models, more specimens prepared after the manner of those in the Museum of the Royal College of Surgeons in London. The vessels and certain spaces and tissues could be treated with radiopaque substances and viewed either in stereoscopic films or directly with a hand fluoroscope. The student could obtain a better knowledge of anatomy in a shorter time. It would require preparation and some expenditure, but the cheapest thing should not be the students' time. An honest, intelligent and critical survey of the pre-clinical courses would show many opportunities to shorten and improve. A moving picture film on electrocardiography which was shown recently suggests many possibilities in physiology.

In surgery there should be less time wasted on the benches while hooded, masked and gowned figures conduct some mystic rites, during which the student observes nothing but the production of blood-stained sponges which are hung on a rack. After all, major surgery receives very few recruits (and should receive fewer) direct from the seats of the operating theatre. With two major surgical procedures the student should have thorough and intimate acquaintance, and should receive much of his instruction on the cadaver. These are the operations for urgent acute appendicitis and for strangulated hernia. Aside from these, major surgery should be a minor subject and minor surgery a major subject. Naturally, this does not apply to surgical diagnosis.

Traumato-therapy should be stressed. Injuries play a much larger part in general practice than formerly. Farming is rated as one of the hazardous occupations, especially since machinery risks have been added to those incurred in the handling of animals. Automobile accidents are proportionally more common on country roads and highways than in the city. A fine Sunday or a holiday seldom fails to bring a crash. These are often enough most serious in themselves and always present the danger spoken of by Kanavel that "Too often minor surgery becomes major surgery through ignorance or incompetence."[4]

What applies to major surgery, applies with even more force to major gynæcology. In obstetrics the courses generally merit approval. Sooner or later the graduate will bless the somewhat tedious hours spent in practising on the phantom. The clinical groups are small enough and near enough to see and understand the procedures. The question that the instructors should ever ask themselves is "How far are these procedures applicable outside the hospital?" For example, is episiotomy in primiparae always advisable? Should every little uterine tear be repaired immediately, regardless of help and surroundings? Most women prefer the gynæcologist to the undertaker.

The most important step in the reduction of maternal mortality is the prevention of sepsis. Yet one of the amazing things, both in surgery and obstetrics, is the small amount of time devoted to instruction in aseptic or antiseptic technique. This is a matter so fundamental, and to the operator it has become so instinctive, that he is apt to forget that it is something absolutely revolutionary to the student mind and that it has to be learned by each successive class. It is not something to be left to the casual care of a hurried and harried head nurse or to a blasé interne. All the modern safety exists only through the principles of Lister, and, if the students display any tendency to judge of the importance of the subject by the rank of the teacher, it should be dealt with by the chief of the department himself. The students should be compelled to follow the instructions and the result should be checked bacteriologically. The patient demands freedom from living germs. It is all one to her whether their execution takes place by boiling or poisoning, burning or being swept away in oceans of filtered water. This seems a little thing—but so is the streptococcus that spoils the death rate. Asepsis in the country must usually be obtained with antiseptic solutions. Thoroughly teach the student how.

In medicine full use should be made of all the new mechanical gadgets, the radio-stethoscope, sound films, and gramophone records, having at the same time due regard to their limitations. Employ laboratory methods to the full, but be careful not to substitute "glass for brains."

Nothing can replace reasoning founded on observation, palpation, percussion and auscultation.

Times change and medical courses must change with them. In 1902 my father wrote casually of having attended 46 cases of typhoid fever in the previous eleven and a half years.[5] There was no epidemic. That was normal. In the last ten years I have seen only 1 case, and that occurred when there was an epidemic in our nearest city.

On the other hand, we see more of the degenerative diseases of the declining years of life. We are also becoming more concerned with the earlier years, and are rapidly replacing the grandmothers as the authorities on babies. Pædiatrics might well play a larger part in the curriculum.

More time should be allotted to clinical instruction in the contagious diseases. Fate seldom leaves more dynamite on the physician's door step than when she comes to call him for a contagious condition. I know of one physician's home which still—figuratively—carries the marks of an explosion which occurred forty years ago. One is called not merely to "a case" but to someone's sick child. Quarantine is more respectable but rather less endurable than jail. Give the student full opportunity for differential diagnosis; let him follow the treatment and then the treatment of the treatment. Serum disease is no fun for either the patient or the physician. The special hospitals for tuberculosis should be visited, and more than once, and instruction given in the adaptation of the methods for home use. In twenty years' time most men find that more of their patients have recovered at home than in the sanitarium. This is no fault of the sanitarium. Because of shortage of beds, and for reasons of economics, and for reasons of spirit, if patients are to recover, many must do so at home. Perhaps, if the sanitarium could be used largely as a school for *all the students* and *all the tuberculous patients*, better results could be obtained. All could have an opportunity to weigh the end-results of surgical treatment. At present the patients are by no means so enthusiastically unanimous as the surgeons.

Let us deal more seriously with the principles of heredity. The "diatheses" of our forefathers have been superciliously neglected, yet evidence is accumulating that they connote even matters of immunity.[6] If we can foretell, may we not postpone, the serious effects of cancer, or of hypertensive conditions, or of mental disease? It is very evident that the general practitioner in the country is particularly favourably situated to observe the working of the laws of heredity in human beings. Who else but the priest (and remember that Mendel was a monk) can trace out the variants of hereditary mental disease expressed in behaviour problems as well as he? He might reasonably be expected to do the major part of research in this regard. Many men in Canada have assisted at the birth of three generations in the same area in which they themselves were born. Vast sources of information remain to be tapped by men who have been interested by means of a little training.

Most of us remember with no small gratitude the demonstration of nursing methods. This might well be expanded and the idea applied to other departments of the allied services. Teach the students to make their diagnoses as far as possible without the x-ray, but arrange a day or two of demonstrations in the x-ray departments. Show them all parts of the apparatus, their uses, their limitations and their fallacies, the simple technique of their operation, and let them peep into the dark-room. The millions of electrical horsepower being developed must find an outlet by distribution into the remoter districts, and many of us use machines now.

Many priceless pathological specimens are lost because students have not been shown how to take them or preserve them. A very short time would do it.

For a profession which is so ready to blame all human ills on defective teeth, it is extraordinary how ignorant the graduate is left in all matters pertaining to dental anatomy, to say nothing of dental pathology and the possibilities of treatment at the hands of a dentist. A "Cook's Tour" through the dental department would be of enormous value. Point out the values and the pitfalls of the dental x-ray film.

In one respect the medical courses are shamefully defective. In Quebec, at least, a man spends twenty years learning how to look after other people and not twenty minutes learning how to look after himself. He is taught the duty he owes to the thousand people who are his quota. Would it appear mercenary if one hour in each thousand was devoted to teaching him what the thousand owe him, and how he is to get it? If it would be over the head or beneath the dignity of a medical man to do such teaching, could not someone be borrowed from the newly exalted Faculty of Commerce. If necessary, the theatre could be disinfected after he left! The universities cannot say that the necessary business and legal training should have been obtained elsewhere; they dominate the educational systems and their requirements are met. In the meantime the graduate and his family suffer for want of even the most elementary instruction.

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Men and Books

THE EARLIEST CLINICAL APPLICATIONS OF THE X-RAYS

BY H. E. MACDERMOT

Montreal

The claim to being the first in any scientific discovery is never to be made without due caution, but so far as our knowledge of the x-rays is concerned there need be no hesitation in giving Professor Roentgen this place of honour. He was a physicist, however, and was interested chiefly in the physical nature of the rays: it may be of some interest to recall the occasions on which they were used clinically.

Roentgen communicated his discovery to the Würzburg Society on December 28th, 1895. On January 24th, 1896, Professor Mosetig-Moorhof of Vienna reported two cases* in which he had used the x-rays to help in diagnosis. In one of these, a bullet had entered the palm of the left hand, but its position could not be ascertained by the ordinary methods of examination. The x-ray showed it lying deep in the fifth interosseous space. The second case was that of a young servant-girl with congenital duplication of the terminal phalanx of the left great toe. The girl insisted on having the deformity corrected by an operation, but the difficulty was to decide which of the two bones represented the true phalanx. The two moved as one, and the joint with the proximal phalanx could not be defined. Again the x-ray solved the problem, showing clearly that one of the bones was merely an outgrowth, and had no true joint. The Professor was fully justified in remarking that these two cases proved the x-rays to be no mere toy, but to have great diagnostic possibilities.

As regards North America, the earliest recorded clinical application of Roentgen's discovery seems to have been in Montreal. The *Montreal Medical Journal* for March, 1896, contains a paper by Professor J. Cox, of the Department of Physics, McGill University, and Dr. R. C. Kirkpatrick, a member of the surgical staff of the Montreal General Hospital, on "The New Photography, with Report of a Case in Which a Bullet was Photographed in the Leg." The paper was read before the Montreal Medico-Chirurgical Society on February 7th, and, after giving an account of Roentgen's work, Professor Cox goes on to say:—

"Nothing has yet been done, beyond what was accomplished by Dr. Roentgen himself, to elucidate the nature of the new rays, but his photographic experiments are beginning to be repeated. With the splendid McDonald collection of apparatus at hand I found no difficulty in reproducing them at the first attempt.* . . . .

What will mainly interest your Society is that within four days of our first attempt we have made two trials of the process as applied to surgery. On Wednesday Dr. Armstrong kindly brought me a case of injury to the hip; but I am sorry to say that after one hour's exposure we obtained not a trace upon the plate (22 in. x 8 in.) I am inclined to attribute this failure to the presence of lead in the black paint of the dark slide kindly loaned by Messrs. Notman, as lead even in a pigment has been found to obstruct the rays.

This morning (Feb. 7th) Dr. Kirkpatrick was good enough to give me the opportunity of trying to locate a bullet which had begun to cause trouble in the leg of a patient. As this is probably one of the earliest cases of the successful application of Roentgen's rays, especially in penetrating such a thickness of flesh, the negative, which clearly shows the flattened bullet lying between the tibia and the fibula, will be seen with interest. The plate

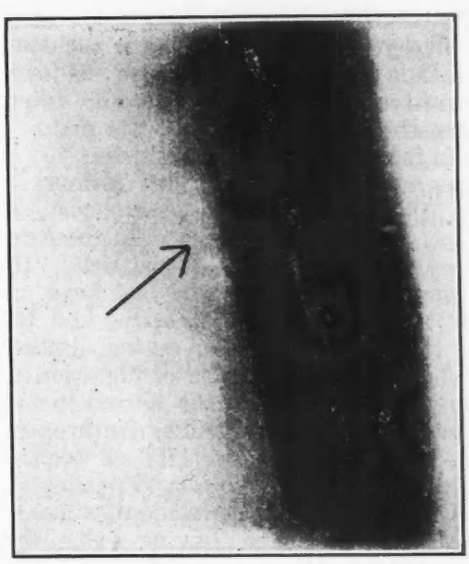


FIG. 1.—Reproduction (reduced) of x-ray photograph in *Montreal Medical Journal*, March, 1896.

was a Stanley, and the exposure 45 minutes. It is clearly under-exposed, and should have had at least an hour and a half. Near the top of the plate may be observed a copper wire tied round the leg, 3 cm. above the entrance to the wound, from which to measure distances. (This wire does not show clearly in the print, although quite apparent in the negative.)"

The picture, of which we give a reproduction, was undoubtedly imperfect, but it was enough to guide Dr. Kirkpatrick in the successful extraction of the bullet, and was also admitted as evidence in the legal proceedings which followed the shooting. It may be added that no earlier instance of the x-ray picture being accepted in a court of law is recorded All accounts agree in saying that there was at first considerable disagreement amongst legal authorities as to the evidential value of the rays. This caution as to their value, indeed, existed in some medical

Wien. Klin. Wchnschr.*, 1896, **9: 83.

*The first pictures were made at McGill University in less than 24 hours after receipt of the journal containing Roentgen's paper.

minds, as we find an editorial in the *Montreal Medical Journal** saying:

"The number of cases in which it can be applied may be few, nevertheless they certainly exist, and it is for us to hail with cordial welcome each advance towards more perfect diagnosis, however limited be its application."

There had been other observations which came close, but not close enough, to forestalling Roentgen. Professor Goodspeed, of the University of Pennsylvania, wrote to *Science* in 1896 to say that he had in his possession two photographic plates which, in 1890, had been exposed in the vicinity of experiments with some Crookes' tubes. The plates had been used primarily to record on films (without a camera) the effect of a brush discharge from a powerful induction coil, and when they were developed they showed two circular shadows of unaccountable origin. No explanation of these was attempted at the time, but Roentgen's announcement five years later recalled the incident, and it was then recognized that these shadows were those of coins which had become interposed between the Crookes' tube and the plate. They were, in fact, true x-ray pictures.

Other anticipations, but less serious, were†: (1) in 1846, by a Greek physiologist, A. M. Esseltja, who in 1846 announced to the Académie Royale des Sciences de Paris that "by the assistance of electric light he had been enabled to see through the human body, and thus to detect the existence of deep-seated disease. He had followed the operations of digestion and of circulation and had seen the nerves in action!" He reserved the name of "The Anthroposcope" for his discovery. (2) In 1709, a certain Mr. Hawkesbee, according to Dr. Priestley, "lined more than the half of the inside of a glass globe with sealing wax, and having exhausted the globe, he put it in motion, when applying his hand to excite it he saw the shape and figure of all parts of his hand distinctly and perfectly on the concave superficies of the wax within. It was as if there had only been pure glass and no wax interposed between his eye and his hand."

*Ibid:
†*Science:* 1896, N.S. **3**: 395. *ibid.*, p. 926.

TREATMENT OF OZÆNA BY ANATOXIN.—J. Garnier has personally treated 14 cases of ozæna in patients aged from 6 to 39 by subcutaneous injections of diphtheria anatoxin, with the result that 12 showed considerable improvement, as manifested by complete disappearance of the fetor of the breath and nasal crusts. He also observed 15 other cases, 12 of which were treated with equal success by the same method. Although no absolute cure was obtained as the turbinated bones did not resume their normal size, the results were sufficiently encouraging to justify further trial of the method.—*Thèse de Paris*, 1932, No. 345.

Association Notes

New Brunswick the Fair

Land of a thousand rivers, dotted with beautiful lakes, clothed in the rich garment of hardy evergreens and the changing raiment of birch, beech, maple and other leafy monarchs, New Brunswick has been aptly called the Paradise of Sportsmen, the Delight of Tourists. Add to these qualifications its rich store of historic fact and prehistoric legend, its easily accessible points of interest, and its wealth of character study among the inhabitants who are descendants of hardy stock, a gift from the old world to the new, and it can be little marvelled that New Brunswick is a Mecca to pilgrims of pleasure and rest.

Running diagonally through the province like a great silver thread is the majestic Saint John River, the Rhine of America, into which flow tributaries which are themselves mighty watercourses. This river rises in the State of Maine but soon crosses the international border, duty free, and, to show its joy, with a bound leaps wildly over the Grand Falls, where its exuberance has been harnessed to supply much needed power. Rounding the corner at Woodstock, it settles to a stately course and pays a quiet and dutiful call at Fredericton, the Provincial Government seat. From there it flows untroubled for some eighty miles, laving the shores of town, village, hamlet and peaceful country community, untroubled by the lowing of cows and bearing on its bosom picturesque river steamers, pleasure yachts and power launches. It sings its swan-song as it passes into the oblivion of Fundy's tides through the gateway of the harbour of Saint John with a crescendo-diminuendo concert that is far-famed as the largest reversing falls in the world. On either side of this mighty waterway stretches scenery that vies with the best in other lands. Mighty heights and bold promontories, covered with verdure or dotted with homes, long vistas of waving trees, through which may be glimpsed the momentary sheen of numerous lakes, delight the eye.

The tributaries of the Saint John and the other rivers of the province, which form a veritable network, are less in size but equal in the grandeur of their landscape. From the heights of New Brunswick peaks, which are easily accessible from travelled roads, a panorama of startling beauty greets the eye of the visitor. Here will you see scenery that combines the beauty of an English country-side and the stark boldness of the Swiss Alps. Here will be found the splendour of Scotch lochs and mountain verdure of the forests of Germany—truly a compact storehouse of scenic beauty.

The western limit of New Brunswick borders the State of Maine and offers opportunity to the visitor for numerous interesting drives. The eastern boundary is the Gulf of St. Lawrence and Northumberland Strait, while to the south is the Bay of Fundy, whose tides climax in the

famous "bore" at Moncton, a wall of water which, twice a day, rushes up the Petitcodiac River.

The names given to interesting places in the province are redolent of history and legend. Many of them hark back to the Indian aborigines. Come to Saint John for the 1933 C. M. A. Convention and see such places as Kennebecasis, Nauwigewauk, Kouchibouguac, Fort La Tour, and others too numerous to mention. A welcome awaits you in town and country, in rivers and lakes, at the sea or in the interior, and—in the hearts of the people.

The Local Publicity Committee,
C. M. A. Convention, 1933.

Preliminary Program for the Sixty-Fourth Annual Meeting of the Canadian Medical Association

TO BE HELD IN SAINT JOHN, N.B., ON JUNE 19th, 20th, 21st, 22nd and 23rd, 1933.

Headquarters—The Admiral Beatty Hotel

Registration will commence at 8.30 o'clock on the morning of Monday, June 19th, in the Admiral Beatty Hotel, and will continue throughout the week.

The first two days, June 19th and 20th, will be devoted to meetings of the Executive Committee and Council, while the scientific program will take place on the remaining three days.

SKELETON PROGRAM

Monday, June 19th

8.30 a.m.—Meeting of the Executive Committee.

10.00 a.m.—Meeting of Council.

1.00 p.m.—Luncheon to Council—Guests of the President-elect, Dr. G. A. B. Addy.

2.30 p.m.—Meeting of Council.

6.00 p.m.—Meeting of Nominating Committee.

7.15 p.m.—Dinner to Council—Guests of the Saint John Medical Society.

Tuesday, June 20th

9.15 a.m.—Meeting of Council.

1.00 p.m.—Luncheon.

2.30 p.m.—Meeting of Council.

7.15 p.m.—Dinner to Council—Guests of the New Brunswick Medical Society.

Wednesday, June 21st

8.30 a.m.—Registration.

9.45 a.m.—Dr. L. DeV. Chipman, Saint John:—Nasal Sinus Infections from the General Practitioner's Point of View.

10.15 a.m.—Dr. Wm. Boyd, Winnipeg:—Tumours of the Neck.

10.45 a.m.—Dr. H. K. Detweiler, Toronto:—The Rôle of Allergy in Disease.

11.15 a.m.—Dr. F. S. Patch, Montreal:—The Significance of Hæmaturia.

11.45 a.m.—Dr. W. Alan Curry, Halifax:—(Subject to be announced.)

12.30 p.m.—Luncheon—Guest Speaker—Judge J. L. Carleton, Woodstock, N.B.

2.15 p.m.—Presidential Address—Dr. G. A. B. Addy, Saint John.

2.45 p.m.—Dr. E. M. Eberts, Montreal:—Papillomatous and Cystic Disease of the Breast.

3.15 p.m.—Sir Humphry Rolleston—Address (Subject to be announced.)

3.45 p.m.—Dr. R. R. McGregor, Kingston:—Post-Vaccinal Disease of the Nervous System.

4.30 p.m.—Reception at the New Brunswick Historical Museum—Guests of Dr. and Mrs. G. A. B. Addy.

8.30 p.m.—Lister Oration—In the auditorium of the Saint John High School. Dr. Robert Muir, Glasgow. Followed by an informal dance at the Admiral Beatty Hotel.

Thursday, June 22nd

9.30 a.m.—Dr. A. Grant Fleming, Montreal:—Organized Medicine and the Public Health.

10.00 a.m.—Dr. Harold R. Griffith, Montreal:—Recent Advances in Anæsthesia.

10.30 a.m.—Dr. Kinnear Wilson (?).

11.00 a.m.—Dr. F. N. G. Starr, Toronto:—The Cancer Problem.

11.30 a.m.—Dr. K. A. MacKenzie, Halifax:—Heart Block (lantern slides).

12.00 a.m.—Dr. A. Primrose, Toronto:—A Chalk Talk on the Anatomy of Hernia.

12.30 p.m.—Luncheon—Guest Speaker—Rev. James Dunlop, West Saint John.

2.15 p.m.—Dr. W. E. Gray, Milltown, N.B.:—Intestinal Obstruction.

2.45 p.m.—Professor Lyle Cummins, Cardiff, Wales:—Silicosis.

3.15 p.m.—Dr. J. G. FitzGerald, Toronto:—The Specific Prevention of Measles, Scarlet Fever and Diphtheria.

4.00 p.m.—A sail on the Saint John River, followed by a sea food dinner on the shore—Guests of New Brunswick Medical Society.

Friday, June 23rd

9.30 a.m.—Dr. I. M. Rabinowitch, Montreal:—
Renal Glycosuria.

10.00 a.m.—Dr. H. B. Atlee, Halifax:—
The Treatment of Pernicious Vomiting of Pregnancy.

10.30 a.m.—Dr. J. S. McEachern, Calgary:—
Pitfalls in the Diagnosis of Conditions giving rise to Chronic Abdominal Discomfort.

11.00 a.m.—Dr. W. F. Roberts, Saint John:—
Physical Medicine.

11.30 a.m.—Dr. Alan Brown, Toronto:—
(Subject to be announced.)

12.00 a.m.—

12.30 p.m.—Luncheon—Guest Speaker—E. J. Henneberry, Saint John.

The entertainment for the ladies is in the hands of a competent committee of Saint John ladies and the details of their program will be published later.

Hospital Service Department Notes

Hospitals and the Report of the Committee on the Costs of Medical Care

Hospitals on this continent will be very much interested in the recent final report of the Committee on the Costs of Medical Care, as many recommendations are of immediate concern to these institutions. While this excellent report deals primarily with medical conditions in the United States, conditions are so similar in these two countries that any proposed solutions made on one side of the border are of immediate interest on the other and, in this instance, many of the recommendations made have been advocated by hospital workers for some time.

The organization of medical practice to form community medical centres grouped around one or more hospitals, with branches where needed, is advocated as a means of reducing costs and raising efficiency by lowering the overhead for the individual service and by permitting closer co-operation between experts and greater utilization of diagnostic and therapeutic apparatus. "Existing hospitals may become community medical centres by:—(1) including general practitioners as well as specialists on their staffs, and providing office space for these practitioners; (2) organizing the medical, dental and nursing staffs as a group; . . . and (3) accepting responsibility for furnishing complete medical service for the local population or for some section thereof." Group-clinics may become medical centres by the addition of hospital facilities or by affiliating with an existing hospital.

The Committee recommends a wider development of "middle-rate hospital service," a plan whereby, with the co-operation of the medical staff, the hospital can supply its paying patients of moderate means with good accommodation and medical service at a comparatively low cost. As already pointed out in these columns, our system here of providing cheap semi-private wards and of "paying public ward" accommodation, operated at less than cost, coupled with the comparatively low level of medical fees in Canada, renders such a special arrangement unnecessary, although some plan whereby there might be a maximum limit to a patient's bill fixed in advance would be of considerable assistance to the patient.

Physicians' private offices could be located in the hospitals, a practice already noted in many hospitals both here and abroad. This would be an important step in the direction of associating general medical service with the facilities of the hospitals, and of assisting in the development of soundly organized group practice.

With respect to municipal hospitals, it is suggested that two or more counties co-operate to support the hospital, as is now done in many of our rural western communities. Canadian hospital workers will endorse the suggestion that these small rural hospitals affiliate with a large general hospital or nearby community medical centre. It has been thought by many that a closer association between rural and urban hospitals, with a joint utilization of physical equipment and of specialized professional services, would be the best solution for the problem of providing the best type of treatment in our smaller hospitals.

In considering the cost of hospitalization, the committee recommended tax appropriations from local and State governments to ensure hospitalization and other medical service for patients suffering from tuberculosis, mental disease, venereal disease, etc. In this respect, Canadian legislation is quite progressive, although still far from adequate. Cities and counties are advised by the Committee to use tax funds for providing hospital service either in the form of new construction or by the enlargement of existing hospitals. Where the physician is not remunerated by the patient, he should be compensated out of this fund, the principle of payment of hospital staffs apparently being endorsed. Group-payment of the cost of sickness, either by insurance or taxation, is advocated, although the majority of the committee did not care to endorse the recommendation to make health insurance a legal requirement for certain sections of the population. Some of the Committee thought that the industrial States at least should immediately begin to plan for compulsory legislation for wage-earners below a certain wage level. However, voluntary co-operative health insurance by organized groups of consumers

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, Secretary, 184 College Street, Toronto.

(industrial, fraternal, educational groups, etc.) is recommended, with payments in agreed instalments and payable to medical groups, hospitals, etc., for services rendered. This brings up the professional difficulties associated with contract practice, but, from the hospital aspect, it is closely related to the various experiments in hospital insurance now being conducted on this continent and which are meeting with considerable approval from hospital administrators.

Among the recommendations concerning professional education, hospital workers will be interested in noting the suggestion that more emphasis be placed in the medical course upon prevention and upon the social aspects of medical practice; that specialties be restricted to those specially qualified; that there be greater post-graduate facilities; that nursing education be thoroughly remoulded; that less thoroughly trained but competent nursing aides and attendants be provided; that adequate training for nurse-midwives be provided; and that arrangements be made for the systematic training of hospital and clinic administrators.

Alberta Hospitals State Their Views on Health Insurance

At the recent convention of the Alberta Hospital Association considerable discussion took place respecting the status of the public hospitals under any health insurance plan which might be adopted. It was pointed out that the hospitals cannot carry any greater financial load than they are at present carrying, and that every effort must be made to protect the personal relationship between patient and physician. The following resolution was passed unanimously:

Resolved, that the Alberta Hospital Association go on record that in the establishment of any health insurance plan in the Province of Alberta, the following principles should be observed:

1. The rights of existing approved hospitals must be safeguarded.
2. Such scheme should be Provincial in scope, with all collections and disbursements by central rather than local authority.
3. Pending a decision to establish a compulsory scheme, consideration should be given to the providing of a voluntary scheme to meet the present demands of individuals and groups for such protection.
4. Freedom of choice of both physician and hospital must be provided for within reasonable limitations as to residence, etc.
5. We advise against the incorporation of any cash compensation for loss of time in any proposed scheme at its inauguration.

"In wounds Nature is the real physician. All that is necessary is to prevent infection in wound diseases. The humours and complexions, diet and weather have no influence. Only the proper treatment, that which lets Nature act in peace, determines the result."—*Paracelsus.*

Provincial Association Notes

PRELIMINARY PROGRAM

For the Fifty-Third Annual Meeting of the Ontario Medical Association,

Hamilton, May 30, 31, June 1 and 2, 1933

The February issue of the *Journal* gave the names of about forty speakers who, up to that time, had been secured to present papers at the forthcoming annual meeting. It would now appear likely that approximately sixty presentations will complete the program. The full list will be available for the April issue of the *Journal.*

The general plan of the meeting is as follows:—

Headquarters—Royal Connaught Hotel

Tuesday, May 30th

10.00 a.m.—Meeting of the Board of Directors.

12.30 p.m.—Directors' Luncheon.

2.00 p.m.—Committee on General Purposes.

5.00 p.m.—Meeting of the Nominating Committee.

7.00 p.m.—Dinner followed by Round Table Conference, program in charge of Committee on Inter-Relations.

Wednesday, May 31st

9.30 a.m.—12.30 p.m.—
General Sessions.

12.45 p.m.—Luncheon—Guest Speaker, Chancellor Whidden, McMaster University, Hamilton.

2.30—4.30 p.m.—
General Sessions—divided into two groups.

7.00 p.m.—Association Dinner and Dance.

Thursday, June 1st

9.30 a.m.—12.30 p.m.—
General Sessions.

12.45 p.m.—Luncheon—Guest Speaker, Dr. W. Sherwood Fox, President, University of Western Ontario, London, Ont.

2.30—4.30 p.m.—
General Sessions—divided into two groups.

4.30 p.m.—A Garden Party will be held at the Sanatorium, where the guests will be received by our President and Mrs. Holbrook.

9.00 p.m.—Arrangements are under way for a meeting of unusual interest to be addressed by one or two outstanding laymen.

Friday, June 2nd

9.30 a.m.—12.30 p.m.—
General Sessions.

12.45 p.m.—Luncheon—Guest Speaker, Principal W. Hamilton Fyfe, Queen's University, Kingston.

2.30 p.m.—General Sessions.

Those requiring hotel reservations for any part of the meeting are advised to write directly to the Royal Connaught Hotel, Hamilton, where the Housing Committee will look after their interests.

Medical Societies

The Edmonton Academy of Medicine

The November meeting of the Academy was held on November 2nd in the Medical Building of the University of Alberta. Under the head of "Business" a letter from the Graduate Nurses Association was read asking for an expression of opinion from the Academy regarding the reduction of fees by private duty nurses, with a view to increasing employment. While no resolution was passed, the general discussion which followed suggested strongly that such a reduction would materially aid nurses in obtaining employment.

The scientific program consisted of, first, a paper by Dr. A. C. McGugan, Provincial Health Inspector, on "Milk-borne streptococcal epidemics". Special epidemics were cited with reference chiefly to those of "septic sore throat". The paper was illustrated by Tables exhibited on a screen.

Dr. H. Mount gave a very interesting paper on "The experimental study of the effect of stimulation and section of the vagus nerve, and its possible relation to asthma." He intimated, as a result of his long continued study of the effects of severing the right or left bronchial branches of the vagus nerve in guinea pigs, dogs and one monkey, that severe and intractable cases of asthma might be greatly benefited or relieved by surgical procedures applied to the vagus nerve. A method of posterior mediastinotomy in the human being, offering an extra-pleural approach to these nerves, has been outlined by Lilienthal. As a result of his experimental work Dr. Mount has shown (1) that in higher animals the nerve supply to the bronchial constrictor muscles is by way of the vagi; (2) that stimulation of these nerves produces many of the signs, symptoms and conditions in the lung that can be compared fairly well to those found in asthma. Whether or not these observations can be applied clinically remains to be determined.

The December meeting of the Academy was held in the Corona Hotel on December 7th at the same time as the Annual Dinner. The outstanding feature of the Dinner was the conferring of honorary memberships on Dr. J. D. Harrison and Dr. E. A. Braithwaite, pioneer physicians, who began practice in Edmonton in 1892, forty years ago. Dr. Braithwaite is Chief Coroner for the Province. Greetings were brought by Dr. Fettes from the Calgary Medical Society and by Dr. Haynes, who represented the Edmonton Dental Society.

Dr. J. G. Young, the retiring President, was Chairman, and the guest speaker was H. Ray Milner, K.C., who spoke on the present financial situation. Dr. John McGregor, Assistant Pathologist at the University of Alberta, was tenor soloist at the function.

The election of officers resulted in the following being chosen for the year 1933: *President*, Dr. Harold Orr; *First Vice-President*, Dr. F. Gillespie; *Second Vice-President*, Dr. H. K. Groff; *Secretary*, Dr. Allan Day; *Treasurer*, Dr. T. H. Field; *Executive Committee*, Drs. J. K. Fife, R. G. Huckell, G. E. Swallow.

T. H. WHITELAW.

The Essex County Medical Society

The Essex County Medical Society invited the physicians of London to attend their December meeting, when a very interesting clinical program was presented. The following cases were discussed:—Spina bifida occulta, by Dr. Maurice Levine; Goitre, by Dr. W. C. Doyle; Syringomyelia, by Dr. H. Kofsky; Fragilitas ossium, by Dr. MacLennan; Ascheim-Zondeck test, by Dr. C. S. Sanborn.

The Middlesex County Medical Society

The first meeting of the Middlesex County Medical Society for the year 1933 was held on January 4th. The chief topics discussed were the handling of indigent patients and the cancer problem.

The Montreal Physiological Society

THE PHARMACOLOGY OF THE PYLORIC AND ILEOCÆCAL SPHINCTERS*

By Hermann Schroeder

The pharmacology of the pyloric sphincter was studied with the help of a method devised by McSwiney and Pyrah. It was found that the activity of the pyloric sphincter is under the control of the pyloric antrum. This relation was analyzed and the observations of McSwiney and Pyrah confirmed. Adrenalin inhibits the peristalsis and the rhythmical activity of the sphincter. Pilocarpin increases the tone of the antrum and the rhythm of the sphincter. Atropine has a contrary action. Ephedrin and the active substances of the posterior lobe of the hypophysis exerted an inhibitory action. Morphine caused

* An abstract of a paper read on January 16, 1933, at the Montreal Physiological Society.

a complete closing of the sphincter. Papaverine proved to be a perfect antagonist of the action of morphine. The effect of morphine on the pyloric sphincter was prevented by morphine-papaverine mixtures of the proportion morphine 1: papaverine 3. The prompt spasmolytic effect of papaverine suggests its use in cases where one wants to avoid the emetic action of morphine and in cases of spastic obstruction of the sphincter.

The pharmacology of the ileocæcal sphincter was studied with a similar arrangement. This method allows a simultaneous recording of the peristalsis of the ileum, the rhythm of the ileocæcal sphincter, and the measurement of the amount of liquid which passes through the sphincter. It was found that the activity of this sphincter is in a certain relationship to the movements of the ileum. This relation was analyzed. There is some suggestion that the movements of the cæcum take part in controlling the opening and the closing of the sphincter. The actions of adrenalin, atropin, pilocarpin, ephedrin, the uterine and pressor substance of the posterior lobe of the hypophysis, and of morphine and papaverine on the ileocæcal sphincter were studied. It was found that morphine causes a contraction of the ileocæcal sphincter. The antagonistic action of papaverine was very evident on this sphincter also. It acted in doses which, according to an investigation of Barlow, do not influence the narcotic action of morphine.

Experiments on unanæsthetized dogs have in fact shown that the emetic action of morphine can be suppressed by papaverine.

The York County Medical Society

The York County Medical Society met at the home of Dr. J. P. Wilson, of Richmond Hill, on January 19th, when papers were given by Dr. L. W. Dales, of Newmarket, on "Medical problems in York County"; by Dr. J. G. Dillane, of Sutton, on a "Pathological study of Joan of Arc and Napoleon Bonaparte"; and by Dr. M. K. Dillane, of Schomberg. All the speakers are members of the medical profession practising in York County. Heretofore it has been the custom to a great extent to secure speakers from outside the local society. Five new members were received at this meeting.

"I do not understand how to quote from learned authorities, but it is a much greater and more estimable matter to rely on experience. They scorn me who am a discoverer, yet how much more do they deserve censure who have never found out anything but only recite and blazon forth other people's works. Those who study only old authors and not the works of Nature are step-sons, not sons, of Nature, who is the mother of all good authors."—*Leonardo da Vinci.*

Special Correspondence

The Edinburgh Letter

(From our own correspondent)

The Annual Conference of the Students Representative Councils of Scotland has just been held at St. Andrews. Satisfactory comments have appeared in the leading newspapers regarding the sense of responsibility displayed by those who may be considered the leaders of Scottish student life. The interchange of opinions among the representatives of the four Scottish universities is of real importance to the welfare and development of university education.

In view of the increasing attention which is being given in all parts of the world at the present time to the subject of the Medical Curriculum, it is interesting to note that a motion was brought forward by Aberdeen to the effect that the universities be petitioned to re-adjust their time-tables so as to allow of special clinical instruction being given in surgery, medicine, and midwifery.

The overcrowding of the universities in these days also engaged the attention of the Conference. The cause of this is, in great measure, due to the depression in industry influencing parents to send their sons to the universities to be trained for professional careers. The Conference was somewhat perturbed about the position thus created, and suggested that the nature and standard of the present preliminary examination should be reconsidered. It is evident that students should not be allowed to matriculate unless their secondary education has attained a sufficiently high standard, otherwise they may find in a short time that the struggle is too much for them.

Mr. G. R. Gair, F.R.A.I., the Lecturer on Ethnology in Edinburgh University, recently delivered a lecture to the members of the All People's Association in Edinburgh on "Ethnology in relation to European Problems." He defined ethnology as treating of man, physically, culturally and nationally. In the past, these problems had been faced from the geographical or historical point of view. He suggested, however, that the ethnological point of view was the most important, as it embraced not only the race factor but all others as well. It dealt not only with the present but its roots went right back into the past. He expressed the view that the rise or fall of peoples did not depend upon the results of an election or of a war, but lay in the potentialities stored up within the bloodstream of the race. In support of this he referred to the Aryan invasion of India, the Nordic supremacy in Ancient Greece, and present conditions in America. He stated that there is no such thing as merging of the races, but only the survival of the race most fitted to a given environment. In other words race reacted to environment and to heredity. If the racial type became unstable and began to degenerate and disappear there

was a general collapse in the area concerned. Consequently, the ethnologist had to study the problems of what were the factors that governed stability, how far a particular race was potent for a particular job, and how far the types were capable of adaptation.

In connection with the re-organization of the municipal hospitals of Edinburgh and the consequent extension of facilities for clinical teaching, the Public Health Committee of the Corporation is shortly to consider a proposal that medical students should "live in" at the Western General Hospital, to enable them to gain a larger experience of practical work. The intention is that about twenty students should reside in the hospital for three months during their last year of study. The benefits of such a practical training are obvious, and it is to be hoped that the Local Authority will agree wholeheartedly with the proposal.

The Annual Dinner of the Royal College of Physicians of Edinburgh was held in the Hall of the College on the 20th of January. In addition to members of the sister professions, the guests included representatives of a large number of public bodies. Dr. Robert Thin, President of the College, was in the Chair. The loyal toasts were proposed by the President. The toast of "The Houses of Parliament" was proposed by Dr. R. A. Fleming and replied to by The Rt. Hon. the Earl of Rosebery, D.S.O., and by A. N. Skelton, Esq., M.P., Parliamentary Under-Secretary of State for Scotland. The latter paid a tribute to the high standard of the work of the medical profession in Scotland, and also referred to the excellent work performed by the Department of Health. He welcomed the extension of hospital facilities that was resulting from the operation of the Local Government Act of 1929. He emphasized the need there was for close cooperation between the statutory hospitals and the voluntary hospitals in order to secure the highest possible efficiency of the hospital service of the country. The toast of "The City of Edinburgh" was proposed by The Rt. Hon. Lord Dawson of Penn, P.C., President of the Royal College of Physicians of London and President of the British Medical Association. The Rt. Hon. the Lord Provost of Edinburgh replied.

The First Division of the Court of Session has just refused an appeal on behalf of a commercial traveller who raised an action against the Lord Provost, Magistrates and Councillors of Aberdeen as the authority responsible for the administration of Woodend Hospital, Aberdeen. The case is one of very considerable importance with regard to the question of the responsibilities of the Managers of Hospitals and other institutions. The grounds of the claim were that the claimant's health was permanently impaired whilst he was a patient in the hospital as a result of alleged careless and neglectful treatment on the part of members of the nursing staff. The Lord President said that the real question underlying a case of this kind was a legal one as to whether and, if so, how far, managers of a hospital were legally responsible for cases of neglect either by medical men or nurses employed by them to attend the inmates of the hospital. It would be hopeless to attempt to make the managers liable for the neglect, assuming this occurred, of any of the doctors whom they employed and whose performance of their functions they sanctioned in the hospital, the reason being that in the performance of these functions the medical man was making available to these patients his services. The managers could neither give him orders nor control him within the limits of the performance of his professional skilled duty. The Court accordingly upheld the decision of the Sheriff-Substitute before whom the case was originally heard and refused the appeal.

R. W. CRAIG.

Edinburgh.

The London Letter

(From our own correspondent)

Exactly a year ago reference was made in these notes to the problem of the outpatient, particularly as it occurred in London, and it was mentioned that King Edward's Fund for London had appointed a committee to inquire into the matter, especially as regards the suitability of patients and the time spent in waiting. That committee has now produced its considered views on the subject. It is obvious that there is both overcrowding and great delay, and this is scarcely a matter for surprise when it is realized that the annual attendances at the outpatient departments of the twelve big teaching hospitals in London have now reached a total of four million. Whether overcrowding itself is the cause of the delay is not altogether clear. Some evidence brought forward suggests that defects in procedure are mainly to blame, while on the other hand it is argued that as long as many unsuitable patients are sent to hospital the long wait before the consultant is seen is inevitable. It seems certain that the primary move must be in the direction of making hospitals more into consultative centres, but while commending this already present tendency the committee seems nervous lest anything should be done to shut the doors of any hospital to any "deserving" case, and actually puts forward the view that it is a good thing for a patient to seek further advice without the knowledge of his own doctor, *i.e.*, hospitals should always be willing to see patients without insisting upon a doctor's letter of introduction. Alongside this point of view, so to speak, is the plea that the outpatient problem can best be solved by greater cooperation between hospitals and practitioners, which seems difficult to reconcile with the previous statement. However, it is all to the good that the committee has been somewhat provocative, and a new committee has now been appointed to put the

present recommendations into action in conjunction with the hospitals. This prompt action will save sterile dispute and subsequent pigeonholing, since the new body has power to act right away.

Some remarks were made in the last letter about the views of the chairman of the National Radium Commission on the problem of radium. It was one of Lord Lee's statements that the massive "bomb" therapy had produced disastrous results, and he rather trounced those who had ventured to criticize the action of the Commission in ordering the discontinuing of the "bomb". Within a few days of his lecture the Conference called by the President of the Royal College of Physicians of London and the President of the Royal College of Surgeons of England to investigate this problem issued a report, based upon the views of technical experts, to the effect that a "bomb" of at least five grams of radium should be established at once. It also expressly stated that such form of treatment was of no danger either to patient or to those manipulating the radium. Further it was stated that no special institution was considered absolutely essential (although ideal) and that existing institutions could be organized for the purpose. All this is rather confusing, as it is so definitely in opposition to earlier "official" pronouncements. The necessity seems to be emerging for some supreme dictator in this matter of radium, whose word, by virtue of his technical knowledge and experience, shall settle all disputes. Otherwise, there seems a chance of this country's remaining far behind others in regard to this form of treatment.

The Christmas vacation is always crammed full with meetings of various authorities concerned with aspects of education and this year, perhaps as a result of Dr. L. P. Jacks' recent plea before the Royal College of Physicians for cooperation between doctor and teacher, has seen several lectures and discussions of medical interest. Dr. William Moodie, speaking, on the educational problems in a child-guidance clinic, voiced a very true word when he said that parents to-day did not know what to believe or to do. Dr. F. C. Shrubsall, at another lecture, dealt with the vexed question of punishment, and, without wishing to be unfair to the speaker by summarizing his remarks too briefly, it seems obvious that he is in favour of corporal punishment—at times. Especially valuable was his remark that there was probably no child psychologist in existence who, having a child, of his or her own, had never spanked it! A particularly useful address at yet another meeting was given by Dr. R. Cove Smith (sometime Captain of the English Rugby Football side) on the risks of competitive games. From such an authority a statement that the organized games of school life could profitably be replaced by fencing, camping, scout-craft, spontaneous play, morris-dancing, and swimming, cannot be ignored or treated with that derision which might otherwise have arisen. It is true that subsequent speakers urged that the competitive spirit was essential in the development of character, but there is no doubt a large body of opinion in favour of Dr. Cove Smith's views, and it would be interesting to hear the child-guidance experts consider the question. His remarks were made at a meeting of the Medical Officers of Schools Association, and it is a pity that there were not a lot of headmasters present to hear his arguments.

ALAN MONCRIEFF.

London.

Topics of Current Interest

Radium From Canada

The possibility of large radium supplies from Canada in the near future was brought forward by Major Bernhard Day in a lecture delivered last week before the Institution of Mining and Metallurgy in London. Major Day has taken part in some extensive prospecting on the shores of Great Bear Lake, about 1,100 miles north of Edmonton, the capital of Alberta. The discovery of pitchblende in this area was made in 1930, when a well-known mining man in Canada, Mr. La Bine—one of the cobalt pioneers—flying with a companion in the North Western Territories, on the east side of the Great Bear Lake, noticed peculiar geological formation. He landed and followed the shore line, making ten miles a day. On the fourth day his companion became blinded by snow glare. A suitable camp site was found, and, after putting tea-leaf compresses on his companion's eyes, La Bine went out to have a look round. Within a quarter of a mile from camp he found uranium-stained manganese ore with infiltrations of the more compact and duller blackness of pitchblende. A few days' work disclosed the magnitude of the discovery, and increasingly rich pitchblende ore was found a few feet below the surface: the veins were traced for many hundreds of feet. Up to now development has begun on four distinct pitchblende-silver workings, and some forty tons of high-grade, hand-sorted pitchblende-silver ore have been shipped from the locality by aeroplane or boat. The pitchblende content of this ore is expected to produce 5 grams of radium. One kidney-like lense, 30 inches wide and about 6 feet in length, produced 6½ tons of pitchblende ore, averaging 72 per cent uranium oxide, yielding nearly one and a half grams of radium. A good deal of work has been done by the Department of Mines at Ottawa on the first batch of pitchblende sent down from the arctic north. A plant has been constructed at Port Hope, some sixty miles from Toronto, on Lake Ontario, with Dr. Pochon, for some years assistant to Mme Curie, in charge, and it is expected that this plant will

have produced its first gram of radium by the end of February next. Owing to the absence of impurities, such as vanadium and thorium, the treatment is said to be cheaper and faster than the treatment of Katanga ores, which are controlled by Belgian interests, and it is believed that the general grade will be higher than that of the Congo deposits. Certain plans are being made for marketing, and Canadian mining men are confident that the discovery can be profitably developed, and that the monopoly so long enjoyed by Belgian interests will soon be at an end. —*Brit. M. J.*, 1932, **2:** 1024.

The Control of Radium

The Silvanus Thompson Memorial Lecture, delivered by Lord Lee of Fareham on the case for national control of radium as a therapeutic agent, deserves the serious consideration not only of those who are actually making use of radium in the treatment of disease but also of hospital authorities and the general public. Lord Lee has been Chairman of the National Radium Commission since its foundation, and during this period has enjoyed wholly exceptional opportunities of reaching sound conclusions. He is emphatic in his belief that, if the best results of treatment are to be achieved, the stock of radium must continue to be under the control of a national organization. For this element remains to a large extent an unknown quantity; great as are its powers in the treatment of cancer, these powers remain in need of further definition and further elucidation. Radium in unskilled hands is capable of inflicting grave harm. As Lord Lee urged, and illustrated by some terrible examples, it is to the best interests of the community that it should never pass into such hands. Workers with this element must, more and more, become specialists prepared to devote their lives to a form of treatment differing in almost every way from ordinary methods. They must further develop for themselves relationships with the physician on the one hand and with the surgeon on the other. Again, the relationship between radium and x-rays remains to be fully determined.

In such circumstances the idea that every doctor should own his stock of radium is clearly untenable. As Lord Lee insisted, it would be a great misfortune if radium became so plentiful that anybody could become possessed of it, and only lack of understanding of the nature of this substance on the part of public authorities can account for the toleration being extended in many countries to vendors of preparations reputed to contain it. He would like further to be sure that all the hospitals which are private owners of radium are using it in the best possible manner. The essence of the Radium Commission's policy is concentration of treatment at specially equipped and staffed centres; it follows that the usual practice must be to bring the patient to the radium rather than the radium to the patient. Radium, further, is made accessible to all patients, including those from rate-aided institutions, subject only to the condition that the need and suitability of the cases for radium treatment shall be the sole determining factors in dealing with them. That these are wise rules nobody acquainted with the special circumstances will doubt for a moment.—*The Weekly Times*, Dec. 15, 1932.

Quack Radium Remedies

In his Silvanus Thompson Memorial Lecture Viscount Lee of Fareham, chairman of the National Radium commission, spoke some winged words about quack remedies that ought to be quoted far and wide in the lay press. The title of his lecture on December 8th was "Radium as a therapeutic agent: the case for national control." Turning to one small part of this subject, Lord Lee insisted upon the need for a rigid control, falling little short of prohibition, over patent remedies, cosmetic preparations, and the like, which contain or profess to contain radium or other radio-active substances. Some of these are harmless, and merely fraudulent because they contain no radium at all, or only a negligible trace. Of a recently advertised cosmetic, "guaranteed to contain actual radium," it was claimed that if applied regularly this would not only remove wrinkles, but "make the contours of the face more delicately refined." These and other miraculous powers resided in a 5s. jar of grease containing less than a farthing's-worth of radium. (The price of radium to-day is about £15,000 a gram.) On the other hand, some commercial preparations containing radium are so potentially deadly that their preparation or sale should be sternly suppressed by law and even made a criminal offence. Lord Lee referred particularly to the so-called "radium waters" which have been freely advertised in America as a harmless cure for every ailment. This deadly beverage really contained an appreciable amount of radium, and its first effect was agreeable and stimulating; so much so that one of its prominent victims drank large quantities and died recently from necrosis of the jaws, acute anæmia, and abscess of the brain. Necropsy revealed the largest amount of radium ever found in a human body—some 30 micrograms. While this may be an extreme case, the credulous public in this country are being flooded with advertisements of "radium remedies" in various forms—drinking waters, pills, hair restorers, soap, and what not. None of these, it is believed, can have the slightest therapeutic value, but if they do contain radium they must be harmful. There is, indeed, as Lord Lee says, no reason why any consideration should be shown to the vendors of quack remedies who prey upon an innocent public by such means.—*Brit. M. J.*, 1932, **2:** 1069.

Overcrowding of the Medical Schools in Germany

The Deutscher Aerztevereinsbund, acting jointly with the Verband der Aerzte Deutschlands, has sent copies of an urgent petition to the federal ministry of the interior, the Prussian ministry of public welfare, and the administrative boards of the universities, calling attention to the rapid increase in the number of medical students and demanding that some form of restriction be imposed to check this dangerous trend.

It is emphasized that further delay will promote radicalism among young physicians dissatisfied with present conditions. The depression has not, the petition points out, led to more sober judgment in the choice of a vocation or profession. In the summer semester of 1931, 4,467 medical students were enrolled in the universities, but that number has now increased. In the opinion of the medical profession, the conditions in the lecture rooms of the universities defy description. That is true particularly of Berlin, Bonn, and Breslau, in the clinics of Düsseldorf, in Frankfurt-am-Main, Greifswald, and Halle, and likewise in Königsberg, Leipzig, Kiel, and Münster. In many of these universities, lecture rooms are so overcrowded that camp chairs have to be used in the aisles, and sometimes students are seen sitting on the staircases as the best available point of vantage for hearing lectures.

The medical profession thinks it is not justified to wait for the effects of a reform in the distant future. Physicians urge that it is not endurable that unlimited numbers of students be admitted to medical schools when the authorities know that they cannot be given thorough training in return for their money expended. In the petition they demand that no more students be admitted to lectures and courses than the facilities justify. The physicians point out that the present facilities are quite equal to the training of all the new physicians that are likely to be needed. It is emphatically emphasized that there is an urgent need that restrictive measures be adopted without delay. The menace to the medical profession, and particularly to the ethics of the profession, is greater than it may seem at present.—*J. Am. M. Ass.*, 1932, **99:** 1276.

It is unwise to use and permit too great familiarity. Who become familiar soon lose the superiority which their previous reserve gave to them; and consequently their credit. We should be familiar with none—never with our superiors, because it is dangerous; nor with our inferiors, because it is derogatory; and still less with the vulgar, whose ignorance renders them insolent, and, unable to perceive the honour that is done them, they presume that it is their due. Familiarity is one of the tendencies of a weak mind.—*Maxims of Gracian.*

Abstracts from Current Literature

Medicine

Asthma Research Council—Report of Progress, June 1, 1930 to October 31, 1931, and Report of Progress for the year ending October 31, 1932.

Organized research in all aspects of asthma is being carried on in several centres in London and elsewhere in Britain. Much of the reports deals with unfinished or inconclusive work which it would be premature to review. Work is still being done on the "proteose" found in large quantity in the urine of asthmatics and in small quantity in many normal urines. A fraction of the asthmatic proteose has been isolated which is not found in normal urine. This fraction gives positive skin tests in the asthmatic from whom it was isolated and in whom it may precipitate an attack of asthma. However, skin reactions were occasionally found in controls. The possibility of using this substance in desensitization is being investigated.

Asthmatic sputum has been found in many cases to contain an organism, the *B. Friedländeri*, which produces a substance thought to be histamine, which has a powerful bronchoconstrictor action. The reactions of the bronchial muscles were found to be profoundly influenced by their calcium environment. Evidence is reported to suggest that asthma is related to an alkaline rather than an acid state of the body. A polysaccharide obtained from pollen was found to give no specific reactions in hay-fever patients (contrary to American work). English grass pollens were not found species-specific so far as their effect in hay-fever is concerned. This statement is made with extraordinary dogmatism, considering the amount of work done elsewhere with an opposite conclusion. Pseudo-ephedrin was found to be less effective than ephedrine, but less toxic, and of definite value.

The importance of the hereditary influence is stressed in the cases of asthma in children. In treatment, glucose has been found of value; sanocrysin, of no value; diet of no importance, except as regards known sensitivities, provided it be well balanced and adequate; respiratory exercise, a helpful adjunct. The importance of prolonged residence in an environment that does not lead to asthma is stressed. After such residence former precipitating causes of asthma are found to be well tolerated. Extra supplies of the various vitamines did not seem to help. Cases of specific sensitization, apart from pollen sensitization, were thought to be rare and to form only a fraction of the sufferers from asthma. Results of specific de-

sensitization were good, when applicable. Complete obliteration of the skin reaction, and complete abolition of symptoms were obtained by desensitization therapy in hay-fever. Sensitivity to foods was frequently associated with deficiency or absence of acid gastric secretion, and an impairment of the liver's power to deal with sugar. T. G. HEATON

Alkalosis in Alkaline Treatment of Peptic Ulcers. Cooke, A. M., *Quart. J. Med.*, 1932, **1**: 527.

The toxic effects of sodium bicarbonate, especially when given to patients with impaired renal function, are well known. In patients subjected to intensive alkaline therapy for peptic ulceration, alkalosis is not uncommon. The author reports 9 cases in a series of 200 patients, rarely receiving more than the equivalent of 10-15 grm. of bicarbonate daily. The cases are reported in detail, and the clinical features of the condition summarized. The patients are usually middle-aged males, with no evidence of pyloric obstruction or of deficient kidney function. After a week of intensive therapy, symptoms develop. Headache, dizziness, paræsthesiæ, anorexia, abdominal pain, vomiting and drowsiness, are marked. The patient is flushed, and looks ill and dehydrated, with rapid pulse, slow respiration and slight fever. The urine contains protein and casts, is strongly alkaline, and increased in amount, up to 3,000 c.c. daily. There is nervous hyperexcitability and, it may be, actual tetany. The blood shows a CO_2-combining power of about 100, with raised non-protein nitrogen, urea, creatinine and phosphate, and a low chloride. Ammonia and chloride are almost absent from the urine. The simplest chemical tests for confirming the clinical diagnosis are the blood-urea estimation and the silver nitrate test for chloride in the urine. If treatment with alkalis is persisted in, general convulsions, collapse, coma and death supervene. Treatment consists in early diagnosis and stoppage of alkalis, recovery being as a rule rapid. The patients are free of symptoms in 3-4 days; the blood is normal in 10 days; chloride does not return to the urine for another week. Renal function is usually normal within a month. The patients are afterwards somewhat intolerant of alkalis. The use of acidotic drugs, as ammonium chloride, in treatment, is not recommended; it may actually be dangerous.

No adequate explanation is offered as to why certain patients develop these symptoms. It is suggested that in some way alkali secretion is impaired and that the renal efficiency is lowered as a result of the alkalosis. There is then a vicious circle, in which alkalosis diminishes renal efficiency and *vice versa*, so that unless alkalis are stopped, death will result.

W. FORD CONNELL

Intrathoracic New Growths and the Value of Bronchoscopy in Diagnosis and Treatment. Davidson, M., *Brit. M. J.*, 1932, **2**: 617.

Benign tumours within the chest are rare. Hydatid cyst is a common condition in Australia. Within the last 15 years, malignant intrathoracic growths have greatly increased in incidence. Sarcomata have been shown to be rare. There are many histological varieties of carcinoma, nearly all originating in the bronchial mucous membrane. Endotheliomata of the pleura with metastases in the lung are noted; also sarcoma of the thymus in children.

Most primary bronchial carcinomata originate just below the bronchial bifurcation and may remain localized for a considerable time. Hence, bronchoscopy is often diagnostic at a much earlier stage than physical examination or radioscopy.

The initial symptoms vary considerably. Hæmoptysis in middle-aged individuals without adequate cause, on physical examination, justifies bronchoscopy. Blood-stained pleural effusion or localized pulmonary infection is suggestive. Bronchitis may be the first and misleading symptom. There are also obvious cases where massive growth is suggested by the symptoms and signs of pressure. The physical signs are most variable. Commonly, the right upper lobe is collapsed, owing to bronchial obstruction. By x-ray, this is revealed by an area of dense opacity bounded below by the interlobar septum. Direct invasion of the parenchyma by growth without bronchial obstruction gives a less dense shadow. Benign growths are distinguished by their especially sharp outline. Lipiodol injection may reveal bronchial blockage at an earlier stage. Bronchoscopy, however, is of value even before lipiodol reveals any change in the bronchus, *i.e.*, in cases of hæmoptysis where no gross obstruction has occurred. Its value is restricted to intrabronchial cases. It is always unpleasant for the patient and there is the danger of idiosyncrasy to cocaine.

In very early cases, treatment may be administered via the bronchus in the form of radon seed implantation, or the growth may be removed endoscopically.

W. FORD CONNELL

Bilateral Cortical Necrosis of the Kidneys (Angioneurotic Anuria). Ash, J. E., *Am. J. M. Sc.*, 1933, **185**: 71.

The author points out that bilateral cortical necrosis of the kidneys is a disease which usually affects pregnant women, but may accompany infectious diseases, follow trauma, or develop cryptogenically. He has collected 60 cases from the literature, of which all but 18 occurred during pregnancy, and has added 2 cryptogenic cases. Both of these were healthy

soldiers taken suddenly ill with abdominal pain, nausea, vomiting, fever and anuria. Both died within three weeks of the onset of the illness. The kidneys in both instances showed almost complete necrosis of the renal cortex, but the columns of Bertini and the pyramids were well preserved. There were no blood vessels large enough to be seen grossly which showed thrombosis or evidence of sclerosis. Microscopically, only the vessels actually within the necrotic zone were thrombosed. In the necrotic zone the architecture was completely destroyed. The disease is thought to be due to some vasomotor disturbance — probably a vasoconstriction that is followed by vasoparalysis and stasis. The striking picture of necrosis and thrombosis which is found post mortem is relatively terminal. The necrotic stage may develop after a few hours of anuria, in which case the patient dies rapidly. It may be deferred for days or may not develop at all. Seven cases in the series recovered.

Treatment appears to have no effect upon the pathological condition of bilateral cortical necrosis, but decapsulation or nephrotomy may favourably influence the stage of angioneurotic anuria prior to the development of the necrosis.

E. S. MILLS

The Effect of Removal of Septic Foci on the Course of Nephritis. Platt, R., *Quart. J. Med.*, 1932, **1**: 499.

Ninety-five cases of nephritis (all forms except chronic) admitted to the Royal Infirmary, Sheffield, between 1924 and 1929, were followed up in 1932 and classified according to whether septic foci were (1) present but not removed; (2) not found; and (3) found and removed. Owing to the wide variations in the natural severity and course of nephritis, it was decided to limit the investigation to cases commencing acutely and showing a definite remission of symptoms after the acute stage. Of 30 cases with septic foci, not removed, 16 were well, 2 doubtful, 4 ill, 7 had recurrence and 1 died. Of 28 cases with no septic foci on re-examination, 16 were well, 2 doubtful, 2 ill, 6 had recurrence, and 2 died. Of 22 patients in whom the septic focus had been found and removed, all are well. Tonsillectomy was the operation performed in nearly every case; one antrum was drained and a few teeth removed. The results of this investigation would appear to indicate that the removal of septic foci has a favourable influence on the course of acute nephritis. It is perhaps, unnecessary to remark that in every case the operation for removal of foci was performed during the period of convalescence or the stage of remission from acute symptoms.

W. FORD CONNELL

Surgery

Maggots and Osteomyelitis. Martin, W. and Heeks, W. G., *Ann. Surg.*, 1932, **96**: 930.

The authors have first studied the life-cycle and the anatomy of the blow-fly and have quite definitely shown that: (1) The maggot has no apparatus capable of gnawing or chewing, as suggested in Dr. Baer's article; (2) maggots have no effect upon the life of bacteria; if anything they further bacterial growth rather than inhibit it; (3) it is difficult to rear maggots in the absence of bacterial activity; (4) no evidence has yet been produced by a competent observer that any ferment with solvent action on bone exists.

The authors have made a detailed study of osteomyelitis, drawing particular attention to the difference in osteomyelitis caused by the various infecting organisms and the variability in resistance of the individual suffering from osteomyelitis. They point out the difficulty of using control series in osteomyelitis, but as a rough control have used one series reported by Kalowski of 130 cases. This report appears in the *Journal of Bone and Joint Surgery*, 1931, **29**: 538. In this series 76.5 per cent were healed; in the second series, of 40 years ago, 407 cases with 84 per cent healed. Dr. Baer's series of 89 cases showed 43.8 per cent healed.

The explanation given for the fact that the granulation tissue appears healthy in those cases treated by maggots is that granulation tissue tends to throw up very rapidly a protective barrier of leukocytes. The authors further substantiate this by reporting the experiment of Giana in applying virulent cultures to open wounds in animals. These cultures were applied (1) immediately, (2) in six hours, (3) in twelve hours. In the first group all the animals died; in the second group 50 per cent died, and in the third group none of the animals died.

The essential treatment of osteomyelitis comprises adequate drainage, the removal of all sequestra, obliteration of any dead space, and sufficient rest to allow healing of the parts.

S. GORDON

Changes in the Wall of the Bladder Secondary to Prostatic Obstruction. Ross, D. K., *Arch. Surg.*, 1932, **25**: 783.

The author grades the changes in the bladder wall in cases of prostatic obstruction into two types. In the first the obstruction gains control early in the disease, and in the second the wall of the bladder retains its ascendency over the obstruction; the obstruction is imperfect and develops slowly, and the wall of the bladder compensates readily on relief of the acute dilatation, accounting for the disappearance of residual urine after catheterization in certain obstructed bladders. Classification of the degree

of change in the bladder wall produced by the individual prostate is possible and, as the bladder is the intermediary in renal damage and infection, the most suitable treatment can be determined by studying alterations in the function of the wall of the bladder. Physiological hypertrophy is the first degree of change and with it frequency and urgency of urination which will be aggravated by infection. Early physiological decompensation is the second degree of change produced by continued obstruction with increasing decompensation. Residual urine has accumulated and there is gradual failure of compensation.

Early anatomical decompensation is the third degree of change and there is a beginning thinning of the peak of anatomical decompensation of the wall. Dysuria has increased as well as the amount of residual urine. The greatest degree of change occurs in the fourth stage and there is a myogenic decompensation and a paradoxical incontinence as the elasticity of the wall has been lost. Long-standing infection greatly increases the degree of decompensation. A series of cystometrograms which graph the changes in the wall of the bladder are given. By them, on the basis of the inter-relationship of pressure capacity and sensation, the status of the wall of any bladder, that is, the mechanics bringing about local symptoms as well as secondary general influences that may enter into the surgical handling of a specific case, can be visualized. Rose favours the two-stage operation in the face of marked decompensation of the bladder. The urethral catheter is well borne in a decompensated wall, but prostatectomy is indicated only after the infection associated with the catheter has subsided with continued suprapubic drainage. Patients with this degree of decompensation usually show evidence of chronic infection and reduced renal function.

G. E. LEARMONTH

Lingual Thyroid. Grace, R. V. and Weekes, C., *Ann. Surg.*, 1932, **96**: 973.

Approximately 130 cases of lingual thyroid have been reported in the literature. It is important to determine whether the gland is present in its normal position. If the isthmus cannot be felt an ectopic gland should be suspected. The condition is commonest in females, the proportion being 8 to 1. The average age of onset is 23. The symptoms are the feeling of a foreign body at the base of the tongue, dysphonia, dysphagia, dyspnœa, occasionally actual asphyxia. Hæmorrhage is not uncommon. The tumour usually has a broad base, is situated in the region of the foramen cæcum, is red, lobulated, and covered with normal mucous membrane. The latter may contain several large veins. A lingual thyroid should never be removed unless one is sure there is thyroid tissue normally placed, or the case has become an emergency. It may be removed orally, or through an incision above the hyoid bone.

STUART GORDON

Tuberculosis of the Thyroid Gland. Rankin, F. W. and Graham, A. S., *Ann. Surg.*, 1932, **95**: 625.

In this article the authors analyze 104 cases of tuberculosis of the thyroid gland, culled from the literature, plus 21 cases operated on at the Mayo Clinic. The incidence of tuberculosis of the thyroid at the May Clinic was found to be 0.1 per cent. The cases predominated in females in the fourth and fifth decades. Active tuberculosis was found elsewhere in 6 cases. It is probable that tuberculosis of the thyroid is always secondary. Three cases were correctly diagnosed pre-operatively. Treatment consists of subtotal thyroidectomy or incision and drainage. Thirty-one cases showed a hyperplasia of the thyroid associated with the tuberculous lesion. It is not known whether a hyperthyroid gland is more susceptible to the tubercle bacillus, or whether the hypertrophy is a response to the presence of the bacillus. One-fifth only of the glands showed caseation. Thyroid deficiency occurred post-operatively in 3 of 115 cases. The prognosis following operation is excellent.

STUART GORDON

Obstetrics and Gynæcology

The Relation of Placental Infarcts to Eclamptic Toxæmia. Bartholemew, R. A. and Kracke, R. R., *Am. J. Obst. & Gyn.*, 1932, **24**: 797.

The authors believe that all placental lesions, excepting some of the gelatinous areas, may be attributed to interference with the fetal circulation, which may be brought about either in a gradual manner from physiological endarteritis or in an abrupt manner from actual vascular rupture, thrombosis, or embolism produced by the trauma from the fetal movements. The infarcts of acute or subacute development are probably responsible for eclampsia and abruptio placentæ, according to whether they are situated in the substance or on the maternal surface of the placenta. Infarcts of slow development are seldom, if ever, responsible for toxæmia, for the reason that the entire villus and its branches dependent on the affected vessel apparently undergo hyaline change thus preventing the passage of poisonous products of villous degeneration into the maternal circulation.

Infarction of rapid development is followed by necrosis and autolysis of the affected placental tissue, thereby liberating poisonous protein split-products, such as peptone, histamine, tyramine, guanidine, etc., by virtue of the proteoses present in all cells.

Considering the variety of protein-cleavage products with various effects, such as inhibition of coagulation, vasodilation, vasoconstriction, agglutination of red cells, toxic effects on vessel walls permitting escape of corpuscles and plasma, spasm of the uterus, etc., it is more readily understood why we may have eclampsia without definite convulsions, eclampsia without much if any elevation of blood pressure, shock, variations in degree of albuminuria or œdema, the unexpected occurrence of abruptio placentæ in the course of what is considered preeclamptic toxæmia, or the occurrence of eclampsia in the course of what appears to be abruptio placentæ or even nephritic toxæmia. It is also probable that histamine or products closely related to it not only account for abruptio placentæ but also for the occasional development of œdema of the lungs and petechial hæmorrhages in the brain of the eclamptic patient. It is also clear why the main effect of eclampsia is seen in the liver, the chief detoxifying organ of the body, and that the lesions in the kidneys support the view that a soluble toxic substance in the blood is responsible for eclampsia.

ROSS MITCHELL

The Morphology of the Genital Epithelia with Special Reference to Differentiation Anomalies. Novak, E., *Am. J. Obst. & Gyn.*, 1932, **24**: 635.

Because of their common derivation from the cœlomic epithelium the various epithelia of the genital tract show a close kinship and possess a considerable degree of interchangeability. Definite endometrial tissue may occur in the tube; in the ovary an endometrial or tubal type of tissue and even on the surface stratified squamous areas or patches of tubal epithelium may occur. Finally, in the normally columnar cell regions of the cervix there may occur stratified squamous "metaplasia," or occasionally a tubal type of epithelium.

Such anomalies illustrate the tendency toward intermutability of these genital epithelia under certain conditions because of their common origin. This fundamental fact must be considered in the interpretation of many pathological lesions, such as endometriosis. In this lesion direct transformation of germinal epithelium into either a tubal or an endometrial type can be demonstrated histologically, so that it seems unnecessary to invoke the doctrine of implantation in explaining this lesion. All types of differentiation transitions may be seen in ovarian endometriosis, that is, a tubal epithelium with or without stroma, a uterine epithelium with or without glands and with or without stroma, an endometrium with or without physiological reactivity, with or without hæmorrhage.

The study of these ovarian epithelia lends strong support to the germinal epithelium origin of serous cystadenomas, for they are often lined by epithelium indistinguishable from that of the tube. The application of such studies to the problem of tubal pregnancy is also discussed in the paper.

ROSS MITCHELL

Researches on the Toxæmias of later Pregnancy. Harding, V. J. and Van Wyck, H. B., *Am. J. Obst. & Gyn.*, 1932, **24**: 820.

Observations on the effect of salt added to the diet and on the use of hypertonic saline solutions show that the normal pregnancy remains normal but that the toxæmic pregnancy manifests an exaggeration of symptoms. A study of many of the older and some of the more recently suggested forms of treatment shows that they cause the removal of water from the body or may be involved in some change in the internal distribution of water. The "œdema" theory of Zangemeister at present offers the most unifying view of the toxæmias of later pregnancy. It requires modification, however, to allow for the formation of œdema in individual organs apart from a generalized water retention, and for the possibility of internal changes in water distribution. Further progress might be made by a more intensive study of the atypical forms of toxæmia and by a wider acceptance, both in theory and in practice, of the value of observations of weight during pregnancy. The variability of the toxæmias of later pregnancy is in harmony with the assumption that they possess one origin and a multiplicity of symptoms.

ROSS MITCHELL

Orthopædics

Fractures of the Neck of the Femur. Speed, K., *Ann. Surg.*, 1932, **96**: 951.

The author wishes to stress two factors which may be used as criteria in prognosis of fractures of the neck of the femur. Intertrochanteric fractures are excluded. These factors are: (1) Has the head of the bone retained its vitality or is it undergoing aseptic necrosis, with or without substitution of bone? (3) Are the supporting bone trabeculæ in the head and neck reforming to give proper weight-bearing support and lasting function?

There remains a considerable percentage of non-unions in whatever method of treatment is used, whether open or closed, due to failure of the head to remain alive. This fact can easily be demonstrated by x-ray, where the head is shown to retain its original density in comparison with the lighter shadows of the adjacent bones. The head of the femur draws its blood supply from the vessels of the periosteum,

capsule and ligamentum teres. This latter has been shown to carry blood vessels up to 1.3 millimetres in diameter. Open operations which interfere with this blood supply are undesirable. Even pegs and bone grafts may interfere with this blood supply coming in through the ligamentum teres. Nowhere in the body is fracture repair slower or more important than in the neck of the femur. Until the trabeculæ of the fragments have resumed their normal alignment it is not safe to allow unrestricted weight-bearing. Failure to observe this rule will lead to poor results.

F. H. H. MEWBURN

Operative Treatment of Paralytic Genu Recurvatum. Campbell, W. C. and Mitchell, J. I., *Ann. Surg.*, 1932, **96**: 1055.

Genu recurvatum occurs following acute anterior poliomyelitis and less frequently following spastic cerebral paralysis or injury to the spinal cord or peripheral nerves. A moderate degree of recurvatum is not incompatible with good function; in fact it may improve the stability of the leg. Where the deformity is great, walking becomes difficult or almost impossible. One of the authors (W.C.C.) first described his operation in 1918, which was the use of the patella as a transplant to the top of the tibia to serve as a bone-block and thus prevent the recurvatum occurring. The operation is well described and illustrated. In this operation the knee-joint is approached from above by a "Z" incision through the quadriceps tendon, which is lengthened. The other author (J.I.M.) has obtained practically the same result by transplanting the patella without lengthening the quadriceps tendon. The authors report 6 cases, with pictures illustrating their improvement.

The authors point out the necessity, at operation, that the leg be placed in full extension or even in some slight recurvatum; also the necessity for a brace with a stop-joint, which shall be worn until x-ray demonstrates bony fusion. They mention Mayer's operation, using a tibial graft, also Gill's operation, using a check ligament behind the knee-joint. Both these writers have reported good functional results.

Their conclusions are, that paralytic genu recurvatum in most instances is the result of muscular weakness and the static force of weight-bearing. When due to anterior poliomyelitis severe degrees of deformity occur in those patients in whom the paralysis is severe and of wide distribution. The deformity is often associated with other deformities of the lower limbs and trunk. The operation of fusion of the patella in selected cases offers a simple and reliable method of treatment. They believe the functional results of the operation are superior to supracondylar osteotomy or any form of ligamentous fixation. They do not believe that an autogenous bone-graft is necessary. If it is inadvisable to lengthen the quadriceps tendon they approach the patella from below.

R. G. HUCKELL

Ophthalmology

Workmen's Compensation Problems. Zimmer, V. A., *Arch. Ophth.*, 1932, **7**: 367.

Comparatively few doctors, except those connected with insurance carriers, realize the outstanding importance of workmen's compensation administration. In ordinary cases the physician has the single duty of diagnosing and treating ailments. In compensation cases, however, there is another distinct duty, not only to the claimant but to society as well, that of determining whether and to what extent the disability and its cost are chargeable against industry in the form of compensation. In no field or branch of medicine is this field of responsibility more pronounced than in the branch of ophthalmology. In no other division is there required a closer study of cases or keener professional analysis to bring about just and equitable disposition. The ophthalmologist in compensation administration is a conspicuous factor because of the great frequency of eye-injuries and their relatively high cost as reflected in compensation awards. Three out of every 100 awards in the State of New York are for eye injuries. The Department in New York is constantly pointing out to doctors the necessity of making and retaining complete case records. Experience has taught that record keeping is even more necessary in eye-cases than in most other forms of injuries.

While it is hardly becoming in a layman to venture advice in technique in eye examinations, a study of case adjudications make certain points under this head manifest even to those outside of the medical profession. For instance, every one knows the prevalency of cases of psychogenic or ocular neurosis in compensation work. Laymen are aware of the difficulty facing an ophthalmologist in diagnosing this somewhat elusive condition. In fairness to the claimant, to industry and to the State, it would seem advisable that oculists make this diagnosis only in conjunction with a neurologist. Again the common complaint of visual disturbances connected with head injuries seems to call for the consistent use of x-rays in definitely locating the cause. Further, the frequency of contentions over pathological changes in eye-cases under adjudication assuredly indicates the advisability of careful slit-lamp study to a greater extent than now seems prevalent. From the standpoint of reducing protracted contro-

versy, the oculist who takes the extra time necessary for minute examinations is a conspicuous asset to the division of workmen's compensation. S. HANFORD MCKEE

Amblyopia ex anopsia in Adult Life. Peter, L. C., *Am. J. Ophth.*, 1932, **3**: 493.

In a former communication, Peter called attention to three groups of acquired amblyopia: first, amblyopia in cases of monolateral eso- or exo-tropia; secondly, amblyopia in adolescence and in adult life, with a history of squint in early childhood; and, thirdly, the type which is observed in adults without a history or other evidence of squint in childhood. The first of these groups has received considerable discussion, while the second and third types are largely over-looked. A careful analysis from the visual field standpoint reveals the fact that the amblyopia in each group has the same characteristics, and that those cases which are observed in adult life are acquired in early childhood and undergo little change throughout life. Phases which are found in each group are: first, a central scotoma about three degrees in diameter, and enlargement of the blind spot of Mariotte, and a moderate contraction of the peripheral fields for form and colour; secondly, a rather high hyperopic error, with anisometropia as an outstanding feature; thirdly, a subnormal fusion faculty, with varying degrees of depth perception; and, finally, a hereditary strain of squint as a preceding factor or the appearance of monocular esotropia in the offspring.

A brief statement of the accepted facts in amblyopia of monocular esotropia, as it is found in childhood, is given, and the second and third groups are discussed in detail.

S. HANFORD MCKEE

Neurology and Psychiatry

Observations on the Etiology and Symptomatology of Disseminated Sclerosis. Adie, W. J., *Brit. M. J.*, 1932, **2**: 997.

Disseminated sclerosis is stated to be the commonest nervous disease seen in private practice, though in hospitals outnumbered by syphilis. Although the cause and precipitating factors are still obscure, much has been learned of the clinical manifestations. Some observations are here given from a study of 118 established cases; 80 cases of acute retrobulbar neuritis have also been studied for the purposes of the communication. The first symptoms are always sudden in appearance. The commonest in this series was some ocular disturbance, such as transitory amblyopia or diplopia; next was found transitory motor or sensory disturbances in the limbs; in 3 per cent of the cases, the first symptom was severe vertigo. Every case was discontinuous; a steadily progressive course is very rare.

The onset is usually in the 3rd or 4th decades; it is rare after 40. If the initial symptom is retrobulbar neuritis (most common in women, and in them often the first symptom) long remissions, up to 20 years or more, are frequently seen. Such long remissions are rare after other modes of onset. Attacks of vertigo, sometimes with vomiting and motor or sensory disturbances, are not uncommon in disseminated sclerosis and should always suggest this diagnosis in a young adult free of ear disease. Trigeminal neuralgia, with no objective sensory changes and relieved by alcohol injection, may be a symptom. A complaint of "electrical shocks" on bending the neck, or pain from the same cause, was elicited in a few cases. Loss of vibration sense in the lower limbs may be the only objective sensory finding. When assessing the value of new treatments, the remarkable spontaneous variation in signs and symptoms must be considered.

Nystagmus, which at once suggests disseminated sclerosis to many, is not always a sign of disease of the nervous system; it is often absent in early disseminated sclerosis and may be present in a curable condition sometimes resembling it closely—spinal tumour. While transient diplopia is common, obvious squint is very rare, as are gross pupillary abnormalities. Despite the great frequency of lesions in the optic nerves, chiasma or tracts, blindness or permanent severe visual loss is almost unknown in this disease.

"Retrobulbar neuritis" is defined as an optic nerve lesion of acute onset and unilateral incidence, characterized by central scotoma and tendency to recover. Pain is always present at the onset. Visual failure is rapid and often severe. Recovery starts in a week or so and is complete within 2 months. The disc is often blurred and pinkish, with indistinct edges, in the acute stage; later, it becomes pale. The author suggests that disseminated sclerosis is probably the only cause of retrobulbar neuritis as above defined, and deprecates the invoking of hypothetical sinus infection or dental or tonsillar sepsis as possible causes of this condition. Forty-one of his 118 cases of established disease gave a clear history of a severe attack of retrobulbar neuritis as an early, or first, symptom. Intense swelling of the discs, or bilateral involvement, is excessively rare in disseminated sclerosis and should be sufficient to change the diagnosis. Of the 70 cases of acute retrobulbar neuritis examined within a week or so of the onset, 31.3 per cent were found to be suffering from disseminated sclerosis; 41.8 per cent was diagnosed as probably disseminated sclerosis; while in the remaining 26.8 no other suspicious sign or

symptom could be found. The fate of this last group could only be known if the cases were watched for ten, twenty or more years.

W. FORD CONNELL

Cerebral Involvement in Head Injury. Russell, W. R., *Brain,* 1932, **55**: 549.

At the moment of injury the whole of the brain tissue undergoes mechanical agitation. This causes molecular disturbance within the nerve elements, probably in the myelin sheaths, which brings about an interruption in the conducting functions of the nerve-cell processes, and leads to instantaneous loss of consciousness. In cases of confusion, disorientation, and altered personality which may occur before full consciousness returns, the patient has no recollection of events shortly preceding the accident. When, however, memory of events preceding the accident was present it was never found to be other than accurate—a point of medico-legal importance. With regard to events following the accident, the patient's ideas may be permanently inaccurate. The mental state is not in any way proportional to the pressure estimated by the manometer. Irritable states probably represent a stage in the recovery of consciousness. Contrary to the commonly accepted opinion in America, the author believes that it is usually undesirable to attempt to reduce cerebral œdema during the first two days. He stresses the importance of combating restlessness, with morphia if necessary, during those early stages.

Headache as a post-concussion symptom is more frequent in the early age-periods than in the later. Dizziness, though common, was usually only slight. Its incidence increases as age advances. Disturbances of memory and mental ability were often found. With a few exceptions these were slight in degree and caused the patient little inconvenience. The incidence of nervousness is greater in the earlier age-periods. It is a very common sequel in young children, in them usually of purely psychological origin. Traumatic neurasthenia is largely caused by fear—fear that he is not getting better, that he will never be fit for work, that his brain is damaged, and so on. For these reasons, simple explanations directed towards adjusting the patient's attitude to his condition form a most important factor in the treatment of industrial accidents.

FRANK A. TURNBULL

Pathology and Experimental Medicine

Vasodilatation in the Limbs in Response to Warming the Body; with Evidence for Sympathetic Vasodilator Nerves in man. Lewis, T. and Pickering, G. W., *Heart,* 1931, **16**: 33.

The authors begin by reviewing the various methods thus far employed to abolish temporarily the sympathetic effect on the blood vessels of the extremities. It will be recalled that Brown produced this effect by inducing an artificial fever by the intravenous administration of typhoid vaccine. Morton and Scott were able to obtain the same result in the lower extremities by spinal anæsthesia. Lewis himself brought about paralysis of the sympathetic supply by injecting a peripheral nerve. Now, the authors propose "the simplest method so far used," to attain this objective. The patient who is to be observed is introduced into a warming chamber with the extremities to be tested exposed to room temperature. The temperature in the chamber is then increased to about 50° C. The normal reaction consists in a distinct increase of about 10 degrees in the skin temperature of the extremities, after the fortieth minute. With this device Lewis has been able to show that vasodilators are present in the vessels of the extremities in man. Thus, the sympathectomized portion of a limb fails to show the normal reaction. If the increase in the skin temperature with the normal instances were the result simply of the inhibited vasoconstrictor supply, then the "warming-chamber reaction" should not disappear following sympathectomy. The conclusion then is, that with sympathectomy the vasodilators (as well as the vasoconstrictors) have been destroyed, and that the usual reaction cannot therefore be secured. Further, the ordinary case of Raynaud's disease will show the "warming-chamber reaction." However, the latter will disappear if a peripheral nerve, such as the ulnar, is anæsthetized prior to the test. The authors see in this additional proof that the peripheral nerve carries vasodilator fibres whose function is temporarily interfered by anæsthetization.

The authors point out the practical application of the warming-chamber to distinguish between the sympathetic and the obliterative diseases involving vessels of the extremities. In those diseases in which the sympathetic system is at fault normal warming-chamber reaction is observed. The best example of this group is Raynaud's disease, although acrocyanosis belongs to the same class by virtue of the normal reaction. On the other hand, those diseases which present obliterative changes in the blood vessels fail to show the average reaction. In this class belong the cases of arteritis obliterans and thrombo-angeitis obliterans.

J. FEIGENBAUM

Experimental Observations on the Effect of Various Diuretics when Injected into One Renal Artery of the Dog. Bartram, E. A., *J. Clin. Invest.,* 1932, **2**: 1197.

The author divides diuretics into two groups, depending upon the mechanism of production of their action: (1) those that appear to exert

their primary effect by a direct action on the renal parenchyma and (2) those that appear to have a different and possibly extra-renal action. Among the first group he includes novasural, salyrgan and theocine-sodium-acetate, which injected in small doses into the left renal artery of the dog, anæsthesized and rendered hydræmic by intravenous injection of saline solution, produced a diuresis from the left side and little change in the excretory activity of the right kidney. In somewhat larger doses diuresis from each kidney varied but little, while in still larger doses the output of the injected side was diminished, and at the same time an active diuresis occurred on the opposite side.

In the second group are included caffeine citrate, theobromine-sodium-salicylate, theophylline-ethylene-diamine, theophylline-calcium-salicylate, urea and digitan. Under similar experimental conditions this group, in contrast to the former, produced a bilateral response, the time interval between injection and onset of diuresis showing little difference as regards the two kidneys. L. J. ADAMS

B. Diphtheriæ, Gravis and Mitis. Parish, H. J., Whatley, E. E. and O'Brien, R. A., *Brit. M. J.*, 1932, **2**: 915.

In 1931 Anderson, Happold, McLeod and Thomson described two forms of diphtheria bacillus, the so-called gravis and mitis forms. They found that the gravis form, easily identified by culture, etc., was almost invariably associated with the severer forms of diphtheria, the mitis with the milder forms. They also suggested that the failure of serum to benefit the patient in certain cases might be explained on this basis.

The writers of the above article have undertaken to check and to amplify Mcleod's work. Using guinea-pigs and rabbits they have tested the response to antitoxin of the two strains, as well as their relative virulence, the potency of their toxin and the severity of the disease that they produce.

They were able to identify the two types of organism described by McLeod, as well as the intermediary forms which he also mentions, but could not substantiate his other claims. They conclude therefore that the interesting association of the gravis bacillus with severe attacks of diphtheria (found by McLeod in Leeds) is a local phenomenon. P. N. MACDERMOT

Therapeutics

A Clinical Study of Artificial Hyperthermia Induced by High Frequency Currents. Bishop, F. W., Horton, C. B. and Warren, S. L., *Am. J. M. Sc.*, 1932, **184**: 515.

The use of artificial hyperthermia induced by high-frequency currents for the purpose of treating certain chronic diseases was suggested by the beneficial effect of malaria therapy in the treatment of paresis. The first experiments by King and Cocke, Neymann and others attempted to parallel the fever alterations of malarial therapy, but subsequent investigations have suggested that the important factors are the height of the fever and the period of time during which it acts. As a result of these observations, Bishop and his co-workers, after careful animal experimentation planned a method of producing continuous hyperthermia over a period of five hours. The patient is placed on a bed with large block tin electrodes to front and back of trunk. He is then covered by a sheet and a cellotex chamber containing carbon filament lamps placed over him, with the head allowed to protrude. The chamber is made air-tight by drapes about the patient's neck. The temperature of the body is rapidly raised by passing through it a current of 5,000 to 6,000 milliampères from a high-frequency apparatus which is a modified diathermy machine. Having thus raised the body temperature the current is shut off and the hyperpyrexia maintained for the five-hour period by means of the carbon filament lamps in the cellotex chamber. The effect on the patient is as follows: during the first 10 to 30 minutes no change occurs except a great outpouring of perspiration; then there is a very marked flushing of the entire skin, following which the temperature rises till the current is turned off. The higher temperature is well tolerated by the patient provided it does not reach 42° C., which is the danger point. During the elevation of temperature the patients often become slightly delirious. They are apt to become excited and pugnacious and to lose all mental restraints and barriers. With this excitement the pulse and respirations mount rapidly. The patient must be quieted by a suitable sedative and chloral hydrate has been found to be the most effective. When the maximum safe temperature 41.5° C. has been reached the patients frequently become quiet and doze off to sleep. Frequent hot drinks are given to compensate for the loss of fluid by sweating. When it is desired to terminate the fever the box is removed and the body exposed to room air. The cooling-off process is best hastened by means of small cool drinks and cold enemata. The patients are kept in bed for 24 hours after the treatment though the normal temperature is usually restored within 4 hours.

The authors have given 100 of these treatments to 57 patients during the past 19 months. There were 2 deaths. The first patients treated were paretics. The results obtained were comparable to those obtained from malarial therapy. The next series was an arthritic group. In this group those who showed the best results were those of gonorrhœal origin. As a whole, how-

ever, acute lesions subsided rapidly and chronic lesions became painless with gradual relief of stiffness and deformity followed by increased mobility. This is effected by two treatments from 10 days to a month apart. Gonorrhœal vaginitis and cervicitis in adults is also cleared up in from one to two treatments.

Finally, the authors sound a warning against subjecting patients in poor physical condition to this treatment. They feel that the contra-indications are similar to those which would hold for abdominal surgical operations. Chronic alcoholism, obesity and myocardial damage add greatly to the risk.

E. S. MILLS

The Treatment of Pernicious Anæmia. Effect of a Single Injection of Concentrated Gastric Juice ("Addisin"). Morris, R. S., Schiff, L., Foulger, J. H., Rich, M. L. and Sherman, J. F., *J. Am. M. Ass.*, 1933, **100**: 171.

Following up the discovery that massive single doses of liver extract produce a better result than the same amount divided into smaller doses, the authors of this article applied this principle to the intramuscular administration of concentrated gastric juice which they believe contains a powerful hæmatopoietic substance. This agent is not an enzyme, as it withstands chemical treatment which destroys any of that group. It would seem to be a hormone which they call "addisin."

Using a highly concentrated preparation of native swine gastric juice, a single injection was given to each of two patients. Within twenty-four hours examination of the blood showed marked changes. Nucleated red cells, hitherto absent or very few in number, appeared in large numbers, also red cells containing nuclear particles, the reticulocytes also showed an astonishingly rapid increase, the red cells and hæmoglobin were slower to respond, but the improvement continued for more than three months, when a maintenance dose was given. This produced no evidence of anaphylaxis. There was a marked general improvement in the subjective symptoms of the patient at the same time.

P. M. MACDONNELL

Tuberculous Empyema. Taylor, A. B., *Proc. Roy. Soc. Med.*, 1932, **25**: 1615.

Seventy-nine cases from the Brompton Chest Hospital, 1925-1930, were discussed. Thirty-seven occurred after artificial pneumothorax; 12 as a primary purulent pleurisy, 13 secondary to serous pleurisy; and 18 arose after spontaneous pneumothorax. The disease is commonly secondary to pulmonary tuberculosis, the spread being either direct or via the blood stream; primary pleural disease occurs, however.

The relative infrequency of tuberculous empyema is explained by the normal tendency to adhesions in the early stages of pleural infection, the focus of suppuration being confined within the granulation tissue of the adhesion. The aim of treatment is to induce pleural adhesions. The clinical picture may vary widely, but diagnosis may usually be based on a sterile effusion with a relatively chronic course.

When the patient's general condition is good, and the disease in the underlying lung is not far advanced, treatment should be energetic and radical. Removal of the fluid should be early, and recollection is best prevented by gas-replacement. Such replacement allows almost complete emptying, prevents sudden changes in intrapleural pressure, allows of x-ray control, and keeps the pleura dry. If further treatment is needed after several replacements, pleural lavage is helpful; after gas replacement, antiseptic lotion is run into the pleural cavity and then aspirated, the pressure being controlled throughout. Dakin's solution or one of the anilin dyes may be used. The former dissolves lymph clots and helps to soften the pleura and so promotes healing. By leaving a negative pressure (10 to 20 c.c. water) the lung may be slowly re-expanded; after two years of maintained collapse, this is generally a safe procedure. With secondary infection or pleuro-pulmonary fistula pleurotomy may be used.

A de Pezzar catheter may be inserted intercostally, and drainage maintained under water, with a slight negative pressure. Oleothorax has quite a vogue in France; it is mainly indicated with considerable toxæmia or rapid reaccumulation of fluid; it was not used in this series. Thoracoplasty is often very highly successful. It is indicated with unilateral active disease, or where the active process is walled-off and re-expansion would be dangerous. Phrenic evulsion is an invariable first procedure.

The results of the treatment of the 79 cases were as follows: (in September, 1931): 25 alive, 46 dead (58.2 per cent) and 8, untraced. Pleural washouts alone were used in 18 cases—mortality 50 per cent. They were used in addition to gas replacements in 57 cases—mortality 52.6 per cent. Drainage alone was used in 11 severe cases—mortality 63.6 per cent. Thoracoplasty was used in 13 cases, with 4 deaths (30.8 per cent).

W. FORD CONNELL

Hyperparathyroidism without Parathyroid Tumour. Lewis, H. H. and Comroe, B. I., *Arch. Int. Med.*, 1932, **50**: 315.

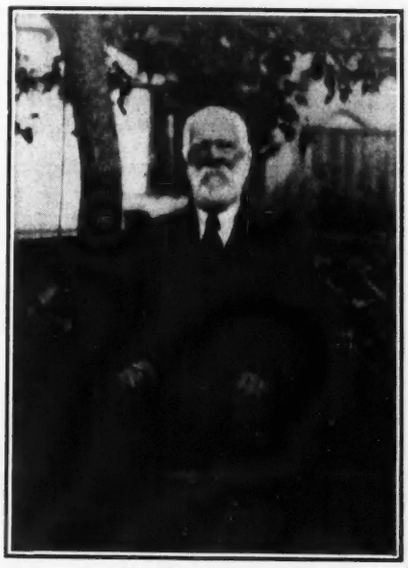
Hitzot and Comroe report a case of hyperparathyroidism improved by partial parathyroidectomy. Pain in the bones and extensive

decalcification were prominent symptoms and led to early hospitalization before advanced skeletal disease had occurred. No parathyroid tumour was found and the removal of one parathyroid body was of no apparent benefit. Subsequent surgical removal of two of the remaining parathyroid bodies brought about a dramatic fall of the blood calcium, with tetany. As the severity of the tetany subsided recalcification of the diseased bone occurred. They suggest that when clinical findings signify over-activity of the parathyroid glands, surgical removal of considerable tissue is justified, even though the operator sees no gross evidence of abnormality therein.

L. J. ADAMS

Obituaries

Dr. Charles Thompson Noble.—In our January issue we published a short obituary notice relative to Dr. Charles Thompson Noble, of Sutton, Ont., who died at the remarkable age of one hundred and one. We are indebted to his son, Dr. Charles Thompson Noble, Jr., for some additional notes and a portrait which we are pleased to publish here.



Dr. Charles Thompson Noble at the age of Ninety-seven

"My father was born in the village of Markham, Ont., on February 5, 1831. He attended McGill in his primary years, and I have heard him speak of Doctor Grant of Ottawa, also of Doctor Church. I think he said that Doctor Bruneau was professor of anatomy at that time, and that when he asked one of the students what passed through the foramen of the atlas the reply was 'a large muscle'. Bruneau said, with a very surprised look, 'Well you have made one great discovery.' Owing to financial reasons Doctor Noble finished his studies at Victoria College, Toronto, in 1856. He was one of the early graduates of that institution, and at the time of his death the oldest graduate of it or the University of Toronto."

He died on November 8, 1932.

Dr. Raymond d'Auteuil, Professor at the University of Laval, Quebec, died on January 10th after a short illness. In his death Quebec suffers a great loss, for, in spite of his youth (he was only 29 years old) he had already acquired a reputation for unusual ability and strength of character. The highest things had been expected of him. He was born at La Malbaie in 1903, and after studying at the Seminary of Chicoutimi he went on to the Faculty of Arts in the University of Laval whence he entered the Faculty of Medicine. His scholastic career throughout was brilliant. He won the prize for surgery at the university *summa cum laude*. After an internship at the Hôtel-Dieu and the Laval Hospital he studied two years in Paris and six months in the United States, where he specialized in orthopædic surgery. He settled in Quebec in partnership with Dr. André Simard, and was on the surgical staff of the Hôtel-Dieu.

Dr. O. Edmond Belcourt, a widely known pioneer of the district in which he lived, died on January 31, 1933, at the residence of his son, J. A. Belcourt, La Fleche, Sask., after an illness of several weeks.

Doctor Belcourt, who was born in 1852 at La Baie du Febrere, Que., celebrated his 80th birthday on December 15th.

He graduated in medicine in 1879 from the Victoria University, Montreal and commenced his medical career in Holyoke, Mass., but had been there only three years when, lured by the call of the west, he moved to Argyle, Minnesota. He followed his profession for 23 years, at which time he went back to his native province and remained there until 1911, when he again went to Argyle, where he carried on for seven years more. It was in Argyle that his wife pre-deceased him, 36 years ago.

In 1918 Doctor Belcourt moved to La Fleche, where he served with untiring faithfulness, the large district then open, and continued his professional work in latter years with his son, Dr. L. E. Belcourt, until about a year ago, when he retired from active service.

He is survived by four children, Rev. Fr. Belcourt, Montreal; Mrs. E. Brunet, Montreal; Dr. L. E. Belcourt, and J. A. Belcourt, both of La Fleche, and a number of grandchildren.

Doctor Belcourt was the last surviving member of his medical class of '79.

Dr. Arthur E. Clendenan, a graduate of the University of Toronto (1891), died at Edmonton on January 23, 1933, from pneumonia, at the age of 64. Coming to Alberta early in the century he was associated with the Provincial Department of Health until 1910 when he was employed by the Dominion Government as a medical inspector. In 1923 he was appointed medical inspector of the port of Victoria, B.C.

Dr. John Albert Couch, of Toronto, who for thirty years practised as a physician in Toronto, died suddenly on January 11, 1933, at his residence. Before coming to Toronto he practised for about fifteen years in Warsaw, Ont. Born in Queensborough, Ont., Doctor Couch was educated at the Lockwood Academy and Trinity College, Toronto, graduating in 1885. Surviving are his widow and one son, Dr. Aaron Couch, Toronto.

Dr. G. A. H. Dufresne, of Montreal, died suddenly on January 26, 1933. Born in Longueuil, Que., on November 15, 1870, Doctor Dufresne completed his classical course at the St. Hyacinthe Seminary, and his medical schooling at the Laval University in Montreal (1894). He soon became affiliated to the university as a professor of physiology. Several years later, he was appointed assistant professor of practical anatomy.

He was married to Thérèse Valois in 1897, and is survived by two sons, Jean Dufresne, member of the reportorial staff of *La Presse*, and Father Georges

Dufresne, curate at St. Cunegonde Church; two brothers, Achille and Victor Dufresne; one sister, Mrs. A. Bourret.

Dr. J. Arthur Fairie, of Montreal, died suddenly at his home on January 8, 1933, at the age of 59. He had retired in 1922. He was a native of Montreal, and graduated from McGill University in Medicine in 1909. He served during the War as an examiner for the medical services. He was a stamp collector and had considerable numismatic knowledge.

Dr. Donald Blair Fraser, Stratford's oldest physician, died at his home on January 18, 1933. Doctor Fraser brought honour to his county by his achievements during his academic career. Born in North Easthope in 1848, Doctor Fraser was the son of John Fraser and Elizabeth Anderson, pioneers, who came to this county from Perthshire, Scotland, and he was brought up in that township. He attended high school in Stratford and went to Toronto to study medicine. In 1874 he graduated, winning gold medals at both Trinity Medical School and the University of Toronto. In 1875, after studies in Edinburgh and London, he sailed as physician on a boat to Australia, and practised for a time in Melbourne. He started practice in Stratford, Ont., in 1876. In 1925 he was given an honorary degree at Toronto, and again in 1928 was honoured at Western University, where he received the degree of LL.D. In 1893 he created a stir in medical circles when he discovered an antidote for carbolic acid poisoning. Predeceased by his wife, he is survived by one son and one daughter; Dr. Donald Fraser and Miss Emily Fraser, both of Stratford.

Dr. Joseph Charles Gandier, of Clinton, Ont., one of the foremost surgeons of western Ontario, was found dead beside his car, a few yards from his home, on the evening of January 21, 1933. A son of the late Rev. and Mrs. Joseph Gandier of Coulonge, Que., and born in 1881, Doctor Gandier was an Arts graduate of Queen's University and a graduate in Medicine of the University of Toronto (1909). He came to Clinton about 25 years ago and practised there ever since. The late Doctor Gandier would have been 52 years of age on February 10th. Besides his widow, four children, Joseph, at the University of Toronto, and Harriott, Robert and Helen at home, survive. Lady Falconer is his sister.

Dr. T. W. Griffin, of Woodstock, N.B., died suddenly on February 5th while talking to his wife. He had been ill for the last two years, suffering from a heart lesion.

Doctor Griffin was fifty-nine years of age, son of the late Thomas Griffin of Debec. His preliminary education was received at St. Joseph's University, and later at St. Francis Xavier, from which institution he graduated with a degree of Bachelor of Arts. He graduated in 1898 from Jefferson Medical College, Philadelphia. He commenced practice in Debec in 1898, but returned to Philadelphia in 1904 as Chief Assistant to Doctor Montgomery. In 1905, he returned to Woodstock. He was a Fellow of the Royal Institute of Public Health in England. His health was excellent until the last, and his love of outdoors caused him to be seen on the streets, where his upright carriage and vigorous bearing belied his age. He is survived by his second wife and two daughters.

Edward Vincent Hogan, C.B.E., M.D., C.M., F.A.C.S., F.R.C.S.(C.), of Halifax, passed away on January 20th, of mitral stenosis, one of the foremost surgeons of this country.

He was born in Weymouth, N.S., in 1875, graduated in Arts from St. Francis Xavier, Antigonish, and from there he went to McGill, from which university he graduated in medicine in 1896. Following that event, he came to Halifax, wrote the examinations of the Victoria General Hospital and was admitted as a house surgeon. He filled that position for two years, then, following several years as ship's surgeon to C.S. *John W. MacKay*, he proceeded to post-graduate studies in surgery in London and Leeds. While at the former he passed the conjoint examination.

On his return to Halifax he was at once appointed to the charge of a service in general surgery at the Victoria General Hospital, which position he held till his death.

He enlisted for army service the day following the outbreak of the Great War, but it was not until the end of 1915 that with No. 7 (Dalhousie) Stationary Hospital he went overseas. As Lt.-Colonel in that unit, his services at the front were characteristic of him, winning high praise everywhere and finally the appreciation of his Sovereign as manifested by the conferring of the C.B.E.

Upon his return home he resumed his position as Senior Surgeon of the Victoria General Hospital, and Head of the Department of Surgery of Dalhousie University. He remained attached to the Military until 1920, and from that time on was Chief Surgeon of Camp Hill Hospital under D.S.C.R.

He was past-president of the Halifax Medical Society, and of the Nova Scotia Medical Society; member of the Senate, Dalhousie University for two periods 1923-25 and 1925-27; Member of the Provincial Medical Board of Nova Scotia; Member of the Council Canadian Medical Association and of Medical Council of Canada and Foundation Fellow of the Royal College of Surgeons of Canada. He was also one of the early Fellows of the American College of Surgeons.

A man of striking personality, most skilful in surgical technique, and a great teacher, he was respected and admired by all who knew him.

In his funeral to St. Mary's Cathedral and to Holy Cross Cemetery, on January 23rd, the military took part. The weather was most disagreeable, but the crowds that stood with bared heads during the service of Committal and during the sounding of the Last Post bore eloquent testimony to the esteem in which he had been held by his community and by the profession which he had served so well.

N. H. GOSSE

Dr. Benjamin Arthur Hopkins, of New Westminster, B.C., died suddenly on January 22, 1933. Born in Moose Jaw, the late Doctor Hopkins graduated from the University of Manitoba in 1905, with the degree of M.D. He practised for some years on the prairies, and since 1921 had specialized in ophthalmology and otology in New Westminster. Favourably known in his specialty, he was even better known as a connoisseur on works of art.

Dr. James Lafferty, of Hamilton, Ont., who had practised medicine there for the past fifty years, died on January 20, 1933, at his home, after having been ill with pneumonia for two weeks.

He was born at Pleasant View Farm in West Flamboro' in 1859, and received his early education in the Waterdown High School and the old Caroline Street Grammar School in Hamilton. Doctor Lafferty subsequently attended the University of Toronto and Trinity College, where he graduated in 1882. He then came to Hamilton to practise his profession as a homœopathic physician, and had been there ever since.

Doctor Lafferty is survived by one sister, Mrs. May M. Fawcett, of Hamilton.

Dr. Bernard Malo, a graduate in medicine of the University of Alberta, died early in January, 1933, in Edmonton where he had been in practice since last spring. He is survived by his wife.

Dr. J. Elie Michaud, of Montreal, died on December 9, 1932,, after a short illness, at the age of 69. He was born at Saint-Barthélemy, studied at the College of the Assumption and the medical college of Victoria. He graduated in 1887 at Merrill, Wisconsin, and prac-

tised for 30 years at Saint-Hughes. He then established himself in Montreal where he lived for 17 years.

Dr. George E. T. Molecey, of Langruth, Man., died suddenly on January 15th at the age of 57. He was a graduate of Edinburgh University and served overseas with the Canadian Expeditionary forces in the Great War. He practised at Whitemouth, Man., before locating at Langruth ten years ago. While there he was Health Officer and Medical Officer for the Indian Reservation. He was a well known rifleman and participated at many meets at Winnipeg and Ottawa.

He is survived by his widow and a son, Lieutenant Robert Molecey, who last year won honours with the Canadian rifle team at Bisley.

Dr. Guy Palmer passed away early in December, at his home in Ucluelet, on the West Coast of Vancouver Island. The late Doctor Palmer was born in 1862 and graduated from McGill in 1885, and had for many years practised among the Indians of the Queen Charlotte Islands, and at Ucluelet.

Dr. F. L. Sylvestre, of Montreal, surgeon at the Ste. Jeanne D'Arc Hospital, died on January 23, 1933, after a short illness. He was in his 65th year.

Born at St. Anicet, county of Huntingdon, son of the late Narcisse Sylvestre and the late Marie de Carufel, Doctor Sylvestre received his primary education at Ste. Marie College. He later attended the College de Montreal and took his medical course at Laval University and at the University of Bishop's College, Lennoxville, from which he graduated in 1893. He was physician to the Forestiers Canadiens, Dollard Court, of which he was a founder, for 35 years.

He is survived by his widow, formerly Corinne Laporte; three sons Dr. Lucien Sylvestre, C. A. Sylvestre and Joseph Sylvestre; four daughters, Mrs. J. C. Tremblay, Misses Claire, Jeanne and Therese Sylvestre; two sisters, Mrs. Antoine Caza, of Cornwall; and Mrs. Louise McNabb, of Windsor, Ont.

News Items

Great Britain

The British Medical Association and the Medical Curriculum. — The growing dissatisfaction with the medical curriculum has found its echo in the columns of the *British Medical Journal* during the past twelve months. The flood of correspondence that followed the publication of "The student in irons" by Dr. C. M. Wilson on March 12th showed there was no lack of interest in this subject among those engaged in active medical practice. In his presidential address to the Metropolitan Counties Branch in June of this year Mr. H. S. Souttar expressed an opinion which is probably widely shared when he said: "I am convinced that we are on the eve of a revolution in the curriculum required from the medical student." The British Medical Association was not slow in acting in a matter in which it has always been concerned. Shortly after the last Council meeting an emergency committee met to consider what contribution the Association could make to this problem of medical education. The matter is still under discussion, and active steps are being taken in order that proposals may be made to the next Council meeting. Conferences in Edinburgh in the early part of this year, the debate at Cambridge in October, and the conference recently called by the University of London, all show that the wind is blowing very strongly in the direction of reform. The important part which should be played by the practitioner in considering the reorganization of medical education was indicated in the title of a leading article in the Journal of December 3rd —"The G.P. and the curriculum."—*Brit. M. J.*, 1932, **2**: Supp. 310.

The Dr. Alfred Cox Testimonial Fund.—This fund has finally been closed, and the response to the appeal has proved to be very satisfactory, £2,095, 13s. 3d. being received altogether. As it was found that the number of applications for reproductions of the portrait was insufficient to meet the cost thereof, the various amounts received for these have been returned to the senders.

Dr. E. Rowland Fothergill, the Hon. Secretary of the General Committee, on behalf of his Committee, wishes to thank all those in Canada who assisted in bringing this campaign to such a successful issue.

Alberta

The Workmen's Compensation Board of Alberta has issued a new list of assessments on employers and employees, and has under consideration a reduction in medical fees during the period of financial depression. It has been found that the average cost of each reported accident has increased considerably during the period between the years 1928 and 1932. Physicians' accounts averaged $9.07 per accident reported in 1928 to $12.48 in 1932. The cost of hospitalization increased from $6.42 in 1928 to $11.12 in 1932, but when the expense of management is added the cost of reported accidents increased from $16.70 to $25.61 during the same period. When it comes to the compensation paid to the workmen, the average amount per claim has increased from $34.64 to $46.19. Due to the fact that the industries have been on short time for the past three years, the increased assessments are required to build up the depleted funds.

Another factor which has entered into this question, is that certain industries have been found from experience to be more hazardous than estimated, and as industries are grouped for assessment purposes, the new rates have had to be increased 50 per cent in some cases, while in others in varying percentages down to 10 per cent. Many industries have had no increased assessments made on them. Some will not be assessed this year at all, as the funds at their credit will carry the accident cases for the present year. To what extent the financial depression has induced malingering will probably never be known, but when the day comes when instruments of precision can measure pain in the back, or in the abdomen or elsewhere, possibly the period of hospitalization will be shortened, though there may be no work available for the patient restored to health.

At the election of members to the Council of the College of Physicians and Surgeons held in December, 1932, Dr. W. V. Lamb, of Camrose, was elected to represent the District No. 4, of Camrose, and Dr. R. B. Francis the District No. 6, of the City of Calgary.

The following physicians have registered recently with the College of Physicians of Alberta: A. B. Blumes, Delia, Alta.; E. D. Emery, Edmonton, Alta.; J. R. Vant, Edmonton, Alta.; M. Marmar, Bowden, Alta.; Malcolm G. McCallum, Edson, Alta.; C. Scribner, Fillmore, Sask.

A recent review of the incidence and mortality rate of diphtheria by the Provincial Department of Health shows that in 1922 there were 732 cases with 121 deaths, while in 1931 there were 151 cases with 26 deaths. The morbidity rate was 124 in 1922 and 20 in 1931. The mortality rate was 20 in 1922 and 2.7 in 1931. The case fatality was 16.5 in 1922 and 17.4 in 1931. The morbidity and mortality rates are based on 100,000 population. Since the year 1925 over 75,000 of the p u-lation have received protection against diphtheria by the use of diphtheria toxoid. At the present time over

45 per cent of the school children and those of pre-school age have been immunized. Had the mortality rate been as high per 100,000 population in 1931 as it was in 1922, instead of 26 deaths there would have been 146.

The sympathy of the profession is extended to Dr. Harold Soby, of High River, who was recently bereaved by the sudden death of his wife.

The many friends of Dr. J. N. Gunn, of Calgary, will be pleased to learn that he is now well on the road to recovery after an illness of several months.

Dr. R. N. W. Shillington, of Lethbridge, has accepted the appointment of Superintendent of the Belcher Hospital at Calgary, and has assumed his duties.

Dr. R. E. Buswell, who formerly practised in High River, has, after an absence of over two years spent in post-graduate work in diseases of the eye, ear, nose and throat in London and Vienna, entered into partnership with Dr. J. M. Adams, of Calgary. G. E. LEARMONTH

British Columbia

The Rotary Clinic for Chest Diseases, of Vancouver, which has been in existence since 1919, has, under a change in policy, recently removed from its former quarters near the centre of the city to the vicinity of the General Hospital. Since its inception this clinic has dealt with approximately 26,000 cases of pulmonary disease, many of them tuberculosis. Under the new conditions, the clinic will be operated as a department of the City Health Department, at the same time that co-ordination with the General Hospital and the continued aid of the Rotary Club are looked for. A substantial saving in operating costs is looked for, while, with an awakening interest in the fight against tuberculosis in British Columbia, the clinic hopes to accomplish still more for the community than has been possible in the past.

During the week of January 23rd, a campaign under the auspices of the Health League of Greater Vancouver, was carried on, in the form of lectures and demonstrations open to the public, in the departmental store of the Hudson's Bay Company and in various schools. The subjects dealt with included prenatal care, infant feeding, play and discipline, mental hygiene in school and adolescence, and simple dietetics. The attendance at the sessions was particularly gratifying, and showed that the laity is prepared to follow if the profession will show the way. C. H. BASTIN

Manitoba

The committee formed by the Winnipeg Medical Society and the Manitoba Medical Association to consider payment for medical services to indigents or those on relief met the Premier, Hon. John Bracken, and the Minister of Health, Hon. R. A. Hoey, on January 12th in the Parliament Buildings. The delegation, which was composed of both rural and urban practitioners, was introduced by Hon. Dr. E. W. Montgomery, Chairman of the Board of Health. After hearing the delegation the Premier congratulated those who had spoken on their presentation. He considered that the doctors had a case but he also stressed the present straitened financial state of the province. He promised to raise the question of payment for medical attention for persons receiving relief at the conference of premiers at Ottawa which he was leaving on the following day to attend. The Canadian Press despatch from Ottawa, dated January 20th, states that this conference decided a limited expenditure of money for medical attention should be made legitimate as a part of the relief service. Up to this time neither federal or provincial governments had acknowledged any liability for payment for medical services rendered to persons receiving direct relief. The committee is continuing its work.

Before approaching the Dominion Government the Hon. Mr. Bracken asked that the medical societies should give him a plan to cover the situation. After deliberation the committee prepared the following outline:—

1. The medical profession of Manitoba believes that responsibility for medical relief rests with the municipality. If the municipality is unable to supply relief, the province must assume the obligation. Failing this, the province and not the doctors should request Federal aid.

2. Payment to be made on a 50 per cent basis of the accepted schedule. It is understood and agreed that this shall not be construed as having any effect on the schedule of fees as it applies generally, or that it shall form any precedent for any general schedule of fees, which may in future be applied to individuals, or the municipality, or the State.

3. *Indigents:* Where the indigency of the patient is in dispute, a local arbitration board shall be given the necessary authority to arrange an amicable settlement, the personnel of the board to consist of the attending physician, the Reeve or other elected member of the Council, and a third party, preferably a resident of the community, to be selected by the two above-named members.

4. *Accounts:* All accounts for the medical treatment of indigents to be submitted to the municipality.

5. Medical treatment shall be deemed to include medical, surgical and obstetrical treatment.

6. As regards cities, these conditions shall apply to those registered on relief with the Relief Commissions.

7. In cases where the city or municipality finds itself unable to pay for such services out of its own resources, it shall be the duty of the city or municipality to make the necessary arrangements with the Government or the Relief Commission, or otherwise, for the advancement of a sufficient sum of money to take care of the payments herein referred to. And further, that it shall not be the duty of the doctor to assume any obligation in that regard.

On January 26th, Dr. F. J. Hart, President of the Winnipeg Medical Society, Dr. J. D. McQueen, Dr. Gordon Chown, and Dr. Percy Bell appeared before the Winnipeg School Board and criticized the efficiency of medical inspection of Winnipeg school children. Doctor Hart declared that the average time of inspection was six minutes per pupil, which, in his opinion, was not sufficient. He urged the Board to make those parents who can afford it pay for the inspection of their own children. He believed that 65 per cent of the pupils could afford to have their own family physician do the work of inspection, while the children of indigent parents could still get the benefit of school inspection.

On January 23rd a meeting of doctors interested in the study of cancer was held in the Medical College. The subject for the evening was "Cancer of the cervix," and Dr. J. D. McQueen was the principal speaker. Other speakers were Prof. Wm. Boyd and P. A. Macdonald, Ph.D., Physicist.

A joint committee from the College of Physicians and Surgeons of Manitoba and the Manitoba Medical Association is considering the question of amalgamation of the two bodies. Many are of the opinion that greater efficiency as well as a reduction in time and effort could be effected if there were only one body.

ROSS MITCHELL

New Brunswick

The new buildings at the Jordan Memorial Sanatorium at River Glade, which are practically completed, have been put in use. The new buildings have cost $50,000 and replace in part the buildings destroyed by fire last year. This construction includes a new diet kitchen, dining rooms for the staff, and nurses and nurses' home. This sanatorium, which is filled almost to capacity, is under the direction of Dr. P. M. Knox. Hon. Dr. H. I. Taylor, Minister of Health, after a recent visit, spoke very highly of the efficient manner in which it is conducted.

The City of Saint John had its lowest tuberculous death rate, since its vital statistics have been recorded, for the year ending October 31, 1932. Computed on the basis of the census taken in 1931, the death rate per 100,000 was 75.78.

Dr. Margaret Parks has been appointed to the staff of the Lancaster Hospital of the Department of Pensions and National Health. Doctor Parks has been for some years on the staff of the Department of Immigration, serving overseas and in Canada.

Dr. W. W. Fleck, of Dalhousie, has in the past month appeared as plaintiff in a suit against the Compensation Board for collection of fees alleged to be due him. The defendant board has claimed that the plaintiff has failed to furnish the Board with reports as to the cases treated, contrary to the regulations of the Board. This case has aroused considerable interest in the province, as compensation work is a part of every practitioner's work.

Dr. E. T. Kennedy is recuperating following a severe attack of influenzal pneumonia.

Dr. W. H. Laughlin has been elected to serve his fourteenth consecutive term as mayor of Milltown.

A. STANLEY KIRKLAND

Nova Scotia

The Medical School of Dalhousie University and the medical profession of Nova Scotia suffered a great loss in the death of Dr. E. V. Hogan on January 20th, after a lengthy illness. Doctor Hogan had been Professor of Surgery and Head of that Department in the University. He was formerly a member of the University Senate and of the Board of Governors of St. Mary's College, Halifax. His loss is mourned by the profession throughout the province as well as by members of the local hospitals, university staff, and of the student-body.

Regret will be felt at the news of the illness of Dr. E. John Stone. He is one of Sydney's oldest and most distinguished citizens. About a year ago he celebrated his golden jubilee as a medical practitioner, and on this occasion was tendered a complimentary banquet by his friends.

Officials of the Halifax Board of Health are stressing the importance of calling in medical assistance earlier in the cases of children's illnesses. They point out that often this is done too late, resulting in serious loss of child life. The Board further reports that the number of cases of measles is much larger than it has been for several years, and that accommodation has not been adequate at the Contagious Diseases Hospital to cope with the cases.

The meetings of the Halifax Medical Society are proving to be of unusual interest. Some meetings are set aside for discussion of set topics. Recently Dr. J. Read read a paper on "Calcium metabolism", and Dr. A. R. Campbell gave an address on "Endometriomata as a cause of pain in women". Some clinical sessions have been held as well.

The new Halifax Infirmary on Queen Street was opened recently for the admission of patients and it promises to fill a big need in the city. It is equipped with the most up-to-date apparatus and its arrangements leave nothing to be desired. The architect, Mr. S. P. Dumaresq, is to be congratulated on the splendid structure that has been erected.

N. B. DREYER

Ontario

Early last year we noted the establishment of an advanced course in Mental Nursing and Mental Hygiene which was instituted in the Ontario Hospital, Whitby. This is the first course of its kind which has ever been given in Canada. The Department of Health announces the results for the first year to be very gratifying. Fifteen nurses registered, and the entire group completed the course and passed the examination. The Department of Health has been able to arrange appointments for the majority of this group, where the special training received can be utilized to its full value.

Dr. J. G. FitzGerald, Dean of the Faculty of Medicine, University of Toronto, in an address before the Royal Canadian Institute on January 16th, dealt with the subject, "Trends and developments in the provision of medical services, preventive and curative."

Dr. A. Primrose, of Toronto, was the guest-speaker at the annual medical banquet of the University of Western Ontario on November 25th last. There was an attendance of over 200 students and faculty members. In his address, Doctor Primrose expressed the opinion that it would be advantageous if some arrangement could be made by which examinations could be abolished. The speaker also stated that Western University is to be congratulated in that registration in the first year is now limited. In addition, he urged that, in all Canadian universities, a better balanced course should be the objective.

At the fall Convocation of the University of Western Ontario, a portrait of the late Dr. Hadley Williams, of London, the gift of Mrs. Williams, was unveiled.

We are pleased to note that Dr. A. D. McLachlin, a 1932 graduate of the medical faculty of the University of Western Ontario, has been awarded the Rhodes Scholarship which is given to the University student who has shown the highest degree of excellence in scholarship, athletics and leadership. Doctor McLachlin is a native of St. Thomas, Ontario, and since graduation has been demonstrator in the Department of Anatomy of Western Ontario University. During his final two years in medicine, Doctor McLachlin won the Roche Award of his own university, which is given for proficiency, progress and leadership. The Rhodes Scholarship entitles him to a course of three years at Oxford University, England, where he will specialize in the study of physiology.

Dr. Jos. S. Stewart, present assistant superintendent of the Ontario Hospital, Orillia, has been appointed acting-superintendent of the Ontario Hospital,

Toronto. Doctor Stewart will succeed Dr. W. C. Herriman, who has been retired on superannuation.

Galt Hospital has received notice of a bequest of $10,000, a legacy from the late Mrs. Hugh McCulloch. The money is to be invested in trust and the interest used to keep up the furnishings of the Hugh McCulloch Memorial Nurses' Home.

His Excellency the Governor-General, Lord Bessborough, officiated at the opening of the new surgical wing of the Toronto General Hospital for Consumptives, Weston, on February 3rd. The afternoon program was followed by tea in the nurses' residence.

The medical staff of the Brantford General Hospital held its annual meeting on the evening of January 11th. Dinner was served at 6.30 p.m., following which Dr. J. H. Elliott, of Toronto, gave a talk on "The antiquity of disease," (with lantern slide illustrations). About forty-four doctors from Brantford and the surrounding district were present.

On January 11th, at the meeting of the Ontario Division of the Canadian Red Cross Society, a budget expenditure of approximately $287,000 was outlined for the current year. The largest individual item, $168,000, is for Red Cross outpost hospital service in the isolated sections of Ontario.

C. S. MacDonald, Toronto, has been appointed chairman of the Board of the Banting Research Institute, succeeding Sir Robert Falconer.

At the annual meeting of the Social Service Association of the Toronto General Hospital, held on January 16th, it was reported that eighteen clinical aides were employed. In connection with the library service, between four hundred and five hundred books are given out each week. Facilities were provided for supplying cars to take home discharged patients who are not well enough to go by street car. The occupational therapy work of the Association has given most encouraging results.

At the meeting of the Essex County Sanatorium, held on December 30, 1932, it was stated that there was a waiting list for the institution and a number of patients had to be sent to the London Sanatorium. During the year 1932 occupational therapy for women and girls was introduced, and manual training classes were carried on for boys. This sanatorium was one of the first in the province where children have been given regular psychiatrical examinations which have resulted in their being given exercises and employments suited to their capacities. J. H. ELLIOTT

Quebec

Contagious diseases in the Province of Quebec during 1932 showed a decrease of nearly 3,000 from 1931 according to the report presented by Dr. S. Boucher, Director of Public Health. While in 1931, 15,034 cases were reported, in 1932 there were but 12,942. In 1931 measles were most prevalent with 7,333, while in 1932, measles, whooping cough and chicken-pox together held the highest records with 3,655, 2,219 and 2,070 respectively.

Infant mortality in 1932 showed a big decrease from 1931 and all previous years, when the ratio per 1,000 births fell, for the first time, below 100, being 97 for the year, with 1,979 deaths of children under one year, as compared with 2,345, for a rate of 113.3, in 1931.

Twenty-eight county health units, covering a total of 36 counties of the Province of Quebec, are carrying the gospel of hygiene and health to over 800,000 residents, according to the annual report of Dr. Emile Nadeau, director. Because of the present strained financial situation, it was not found possible to organize any new centres during the year 1931-32, but the movement is expected to gain momentum as soon as conditions improve.

The results obtained from the 28 units fully warrant this prediction, for they have been such as to justify fully the endeavours of the supporters of the system. During the fiscal year under review, a total of 306,198 persons attended the public or special lectures given by the sanitary inspectors and nurses in charge of the health centres. This was followed up by the distribution of 441,771 pieces of educational literature, prepared specially for mothers and children. The local press has supplemented the campaign by the free publication of 250 articles. Furthermore, 66,467 personal interviews and 55,852 letters were registered.

The detection and control of infectious diseases has been very effective, particularly since the creation of a special section of Epidemiology. A total of 5,089 cases were reported, as compared with 4,505 the previous year, which necessitated 2,651 investigations in 4,282 homes, with supervision of 13,049 contacts or suspects, and isolation of 3,344 persons.

The campaign against tuberculosis is proceeding actively, in the health units, with the organization of tuberculosis dispensaries, and of travelling clinics. A total of 23,893 persons were examined, of whom 2,185 were diagnosed as suffering from active tuberculosis. The nurses have made 13,540 visits in the homes, giving the necessary advice and care.

Vaccination was given for the prevention of smallpox to 30,410 persons, with 4,636 cubic centimetres of vaccine. The campaign undertaken to induce parents to have their children immunized against diphtheria is obtaining results. On June 30th, 57,773 children had been completely immunized, to which can be added 53,770 previously immunized. A total of 14,110,000 units of anti-diphtheritic serum was employed in declared cases and contacts, without charge. This is in contrast with the figure of 23,181,000 in the previous year, which is regarded as showing the effect of the campaign.

In the child hygiene section, 1,700 clinics were held, where 39,053 children were examined. Following these clinics, 126,077 children were examined at home, or at school. The report shows that 11,355 classes were visited and 152,678 children examined. During the same period, 143,525 children were referred to the family physician, the dentist or the oculist. As a result, treatments were given during which 71,488 teeth were extracted or filled, 7,594 tonsils were removed or treated, 2,483 adenoids were removed, 13,087 cervical glands were treated and cured. In addition, 2,893 cases of vision were improved, and 1,009 cases of goitre cured.

Inspections numbered 32,421 divided as follows: 1,326 house inspections, 4,844 buildings, 3,421 dairies and 2,890 hotels and restaurants.

The big event for Montreal, in a medical way, during the month of February, was the meeting there of the American College of Physicians. The things about this gathering which impressed the outsider were the high quality of the papers presented, the keen interest of those present, and the smoothness with which the many arrangements and adjustments were carried out. Great credit is due to Prof. J. C. Meakins, of McGill, and his efficient committee for the perfection of conception and operation of the machine. Naturally, the burden of the clinical presentations fell for the most part on the medical faculties of McGill and the University of Montreal, together with staffs of the affiliated hospitals. They rose nobly to their tasks, and the material presented was of a most interesting and helpful character.

The exhibits, while perhaps not so numerous as one could have expected, were well selected, and a most profitable time was experienced by those who took the trouble to study them. Notable among them were the portable x-ray machines; the display of "Emmenin" by Ayerst, McKenna & Harrison, of Montreal; the book displays of the Macmillan Company of Canada and the J. B. Lippincott Company; the specimens and illustrations relating to congenital heart disease presented by Dr. Maude Abbott, of Montreal; pathological preparations of great rarity and interest from McGill University, and many excellent wax moulures from the Montreal General and Notre Dame Hospitals. Dr. A. H. Pirie, of Montreal, also demonstrated his method of enabling one to see with closed eyes.

The attendance at the convention was large.

A post-graduate course in dermatology and syphilology will be given in Montreal under the auspices of the Montreal Dermatological Society during the month of May next. The teaching will be given at the Montreal General, the Notre Dame and Royal Victoria Hospitals, and will begin on May 14th, lasting for two weeks. Clinics will be held each morning for five days in the week, and there will be lectures in the afternoon between 5 and 7.30. Instruction will be given in English and French. There will be a fee of $25.00. Further notice giving details will appear next month.

Saskatchewan

Saskatchewan is fighting a winning battle against the scourge of tuberculosis, according to the records of the Saskatchewan Anti-tuberculosis League. A report of Dr. R. G. Ferguson, Medical Superintendent of Sanatoria, presented at the recent meeting of the Board of Directors of the league held recently, showed 34 less patients under the care of the league at December 31st than at the same date one year ago. As a result of the decrease in the number of patients, together with reduced staff and salaries, the levy on urban and rural municipalitities has been reduced by $60,000 for 1933.

During 1932 there were 2,092 persons examined at sanatoria; 1,646 at city clinics; 1,369 by travelling consultants; 720 examined at normal school; 803 contacts by family physicians; 194 school children in the Fort Qu'Appelle district; and 12 babies born of tuberculous patients in sanatoria cared for by the league. In addition, 3,334 ex-patients who have treated at sanatoria were examined, and only 22 showed relapses. Of these 18 were required to return to sanatoria for treatment.

The estimated requirement for the League for 1933 is $672,000, as against $691,000, or a reduction of $19,000.

The Anti-tuberculosis League is composed of the majors of all cities and towns of Saskatchewan, the overseers of the villages, the reeves of the municipalities and, a number of trustees appointed by the annual meeting of the association.

Funds covering the operation of the League are made up by payments from the rural and urban municipalities, a dollar per day per patient grant from the government, a grant from the Dominion Government to cover ex-service patients and Indians, and a small donation from the local improvement districts. This year's estimates are allotted to the various paying bodies as follows: urban and rural municipalities levy, $361,000; government grant (estimated, $280,000; Dominion grant (estimated), $16,000; local improvement districts, $13,000.

Practically the entire population of the Cumberland House country, numbering 300 persons, suffered from influenza this winter, according to Miss E. K. Cotter, nurse of the Department of Health of Saskatchewan, who made a hurried trip to The Pas recently to pick up supplies for the outpost, 100 miles up the Saskatchewan river.

Muffled in parka and wearing moccasins, Miss Cotter arrived by pony and carriole with a native driver, after a two days' trip from her headquarters at the historical Cumberland House.

"We stopped at an Indian's camp. I just put my sleeping bag on the floor. With the 'flu' epidemic making headquarters in every camp across the country, I've been on the trail day and night this winter."

Service in the World War prepared Miss Cotter for the strenuous duties beyond the frontiers, where accidental gunshot wounds, and sudden illness, call for the action that takes the nurse through the trackless forests throughout the long winter. During this, her third winter in northern Saskatchewan, Miss Cotter has relied on a pony and toboggan for transportation. The toboggan is equipped with canvas sides of the carriole type.

The nurse covers 50 miles east and west of the trading post on the Saskatchewan river. A call to Birch river means more than 25 miles southeast, while a run to Sturgeon Landing is 45 miles to the northeast.

Miss Cotter visits the Indian Schools once a month, summer and winter. She examines the children, prescribes for the ills, real and fancied, among the older Indians and endeavours to correct unsanitary habits. She teaches cleanliness as a way to health, and the following of a program of child-welfare and dieting.

When Miss Cotter started on her rounds of the camps three years ago, she ran up against a decided antipathy towards the "white man's cures". This clash between the old and the new, and the conflicting beliefs of the two races in widely separated stages of development had to be met with tact and patience, as well as perseverance, if desirable results were to be obtained. And three years have seen a remarkable change in the attitude of the natives toward public health methods.

One of the meanest trips Miss Cotter has suffered was during the fall "freeze-up" when she was en route to Cumberland with two canoemen. Ice started forming after the party left The Pas. Half way to the post the craft was frozen to ice. They had to camp on the shore for eight days before the ice was sufficiently safe to travel. Then they left the canoe and walked the rest of the way to Cumberland, where the nurse mapped out plans for the winter.

LILLIAN A. CHASE

United States

American Students Studying Medicine Abroad

Country	*1930–31*	*1931–32*	*Increase percentage*
Great Britain	322	339	5
Canada	300	308	3
Austria	114	188	50
Italy	78	155	100
Germany	72	183	150
Switzerland	65	214	230

—*J. Am. M. Ass.*, 1932, **99**: 741.

Citizens of the United States Studying Medicine in Canada

College	*No. of students in 1931–32*
Dalhousie University	25
Laval University	14
McGill University	207
University of Montreal	27
Queen's University	14
University of Toronto	2
University of Western Ontario	13
University of Manitoba	2
University of Saskatchewan	4
University of Alberta	0
Total	308

—*J. Am. M. Ass.*, 1932, **99**: 741.

General

The Royal College of Physicians and Surgeons of Canada.—For the information of our readers, we publish herewith the questions set by the Royal College of Physicians and Surgeons of Canada during the past two years.

Primary Examination

PHYSIOLOGY

Montreal and Edmonton—September 28, 1931—3 hours

1. How is the muscle of the small intestine distributed and arranged? Describe the movements observable in this part of the intestine, giving at the same time the experimental procedures that have been adopted in studying them.

2. Discuss briefly the advances in the knowledge of physiology which the development of the modern methods for complete hepatectomy in mammals has been made possible.

3. Under what circumstances would you resort to artificial respiration? How may it be carried out? What are the signs of asphyxia, and how would you proceed to relieve this condition?

4. Discuss in detail, giving all the known examples, the liberation of chemical substances by nerve impulses.

5. Describe the structure of a kidney tubule with its blood supply. Discuss in the light of available experimental evidence the question of physical filtration of urinary constituents in the region of Bowman's capsule.

6. Discuss briefly the present state of knowledge concerning the chemical substances of physiological interest which may be prepared from the anterior and posterior lobes of the mammalian pituitary body.

Primary Examination

ANATOMY

Montreal and Edmonton—September 29, 1931—3 hours

1. Describe the fourth ventricle of the brain.

2. Where are the chief lymph-nodes situated in the head and neck?

3. Describe the blood supply of the heart (arterial and venous).

4. Describe the position and relations of the structures exposed by removal of the deltoid.

5. Give the origin, course, distribution and anastomoses of the inferior mesenteric artery; give a description of its companion vein.

6. Describe the metatarsal bone of the great toe; name the muscles attached to it, together with their nerve supply and actions.

Primary Examination

PHYSIOLOGY

Toronto—October 11, 1932—3 hours

In answering the questions, candidates are requested to confine themselves to what is asked, and are informed that no credit will be given for irrelevant matter.

1. Given an account of the general appearance and life history of the structure known as the corpus luteum. What physiological part does it play? Cite the experiments on which your conclusions as to function are based.

2. Given an account of protein digestion from the point of view: (1) of the enzymes concerned, with their site of occurrence and conditions of action; (2) of the chemical transformations involved. Discuss the significance of this digestion in relation to the proper selection of body protein.

3. Discuss the mode of control of the circulation through the coronary arteries.

4. Giving as much detail as possible, state the specific parts of the brain to which nervous impulses proceeding from the retina of the right eye are eventually relayed.

5. Where are the red blood corpuscles manufactured? Discuss the various factors which control the rate of their production.

6. What various nerve impulses, affecting different bodily activities, find their path in the vagus nerve?

Primary Examination

ANATOMY

Toronto—October 11, 1932—3 hours

In answering the questions, candidates are requested to confine themselves to what is asked, and are informed that no credit will be given for irrelevant matter.

1. Enumerate the muscles which attach the pectoral girdle and upper arm to the trunk and head, noting the nerves and spinal cord segments by which they are supplied.

2. Give a description of the mandibular (temporomandibular) joint, and explain its mechanism.

3. What is meant by the "portal system?" In what regions and by what tributaries is it in communication with the systemic system? Give the anatomical relations of the portal vein.

4. Describe the course and relations of the pelvic portion of the male ureter. In what respects do the relations of the female ureter differ from those of the male?

5. What are bursæ mucosæ? Where are they situated round the knee-joint? and what purposes do they subserve?

6. Describe a dissection designed to expose the sterno-costal (anterior) surface of the left ventricle of the heart from in front.

Final Examination

SURGERY

Toronto—October 12, 1932—3 hours

In answering the questions, candidates are requested to confine themselves to what is asked, and are informed that no credit will be given for irrelevant matter.

1. Discuss the pathology and treatment of Hirschsprung's disease.

2. What are the causes of "flat feet"? Describe the pathological anatomy of the condition. Discuss the treatment.

3. Describe the apparatus used in the modern non-operative treatment of fracture of the shaft of the femur and indicate their uses.

4. Describe the arterial blood supply of the colon and indicate its influence on the operative treatment of carcinoma.

Final Examination

SURGERY

Toronto—October 12, 1932—3 hours

In answering the questions, candidates are requested to confine themselves to what is asked, and are informed that no credit will be given for irrelevant matter.

1. Describe the usual symptoms in a case of severe traumatic shock. Give an account of the physiological and pathological changes in the circulation, together with a statement of the modern conception of the causation of such changes. Correlate such changes with the symptoms observed and upon this basis indicate a rational treatment of shock.

2. Describe the varieties of complications that may appear in the lung following operations and the administration of anæsthetics. Give a general discussion of the way or ways in which such complications arise. Trace briefly the later progress of the pathological changes in the lung, indicating the possible end-results. Make brief suggestions as to how such complications may be avoided.

3. Discuss in a general way the subject of acute obstruction of the small bowel, as caused by mechanical interference, indicating cause, symptoms and signs, and

the differential diagnosis. Describe in particular the changes that may occur in the blood chemistry. Without describing possible operations, discuss the pre- and post-operative treatment in so far as it is influenced by the alteration of blood chemistry and by the eventual development of post-operative adynamic ileus.

4. Discuss generally the question of subdural hæmorrhage resulting from injury to the skull.

Final Examination

SURGICAL PATHOLOGY

Toronto—October 14, 1932—3 hours

In answering the questions, candidates are requested to confine themselves to what is asked, and are informed that no credit will be given for irrelevant matter.

1. Actinomycosis in the human subject has a predilection for certain regions—where are these? Describe the procedure to make a conclusive diagnosis of the condition.

2. Signs of an impending gangrene are observed in the foot of a non-diabetic and otherwise healthy individual of thirty-five years. What is the nature of the vascular lesion? and how do you determine the functional efficiency of the vessels?

3. Give the usual autopsy findings in a fatal case of enlarged prostate.

4. Discuss the various inflammatory processes which may start in the middle ear, and describe the possible extensions and complications.

5. A tumorous mass is found to be projecting from the superior maxilla. Briefly describe the characteristics of each type of tumour which may be found in this region; and also indicate the relative malignancy possessed by each.

Book Reviews

Acromegaly. F. R. Atkinson, M.D., C.M. 260 pages, illustrated. Price 21 shillings. John Bole, Sons, & Danielsson, London, 1932.

This book is a monograph on the subject of acromegaly. Sir Arthur Keith has written a short foreword commenting upon the need for such statistical studies as represented by this volume.

The first chapter is a historical sketch of the disease, which he divides into two periods, that before the disease was placed on a firm clinical footing by Marie, and the years since that date. Subsequent chapters deal with the pathological, clinical, and etiological aspects of the disease. These topics are discussed in an exhaustive manner, but the method of presentation is such as to render them easily read. Eighty-three pages are devoted to the text. The remainder of the volume is a carefully compiled list of all reported cases of the disease, with author and outstanding clinical features.

The book will be of considerable value as a reference work on this subject.

The Principles and Practice of Rectal Surgery. Wm. B. Gabriel, M.S., F.R.C.S., Surgeon to St. Mark's Hospital for Cancer, etc. 248 pages, illustrated. Price 20 s. H. K. Lewis, London, 1932.

This is a royal octavo volume of 240 pages, 162 of which are devoted to the minor surgical conditions about the anus and rectum, such as hæmorrhoids, anal fissure, fistula in ano and perianal suppuration. These subjects are discussed in much detail, making the book very useful to the many general practitioners who undertake the treatment of these conditions. The injection treatment of hæmorrhoids and pruritus ani is also fully presented. The space devoted to cancer of the rectum is too limited to permit an adequate presentation, yet it contains many considerations of value in deciding upon the type of operation indicated. Radium in the treatment of rectal cancer the author has found to have a very limited field of usefulness.

The literature of the surgery of the rectum owes much to the work done at St. Mark's Hospital. This book fully maintains the high standard of previous publications by the surgeons of St. Mark's. Its illustrations effectively clarify the text and its matter is well arranged.

In the introduction the author expresses the hope that the book "will prove of value to proctologists, to general surgeons and to general practitioner." The reviewer believes that it will prove of value to the general surgeons and to general practitoiners." The tioner who undertakes the treatment of minor surgical conditions.

The Colon, Rectum and Anus. Fred W. Rankin, M.A., M.D., F.A.C.S., Division of Surgery, J. Arnold Bargen, M.D., M.S., Division of Medicine, and Louis A. Buie, B.A., M.D., F.A.C.S., Section on Proctology, The Mayo Clinic, Rochester. 846 pages, illustrated. Price $10.50. W. B. Saunders, London and Philadelphia; McAinsh, Toronto, 1932.

This is a monumental work, written by an exceptionally well qualified group of men. There are twenty-eight chapters, which deal exhaustively with the anatomy, embryology and the different diseases of the colon, rectum and anus. There are excellent chapters on modern methods of diagnosis and anæsthesia. The chapter on operative procedures is clearly written and gives in detail the technique employed by a master surgeon. The illustrations are numerous and beautifully reproduced by the publishers. The bibliography is extensive and up-to-date.

The work as a whole is a masterly presentation of the subject and is a very valuable addition to medical literature, for which great credit is due to both the authors and publishers.

Synopsis of Surgical Anatomy. Alexander Lee McGregor, M.Ch., F.R.C.S., Lecturer on Surgical Anatomy, University of the Witwatersrand, Johannesburg. 609 pages, illustrated. Price $5.25. John Wright & Sons, Bristol; Macmillan, Toronto, 1932.

There is a definite need for such a book as this on surgical anatomy. The student's work in the dissecting room may be changed from pure drudgery to an interesting and even exciting quest for information if he knows the clinical experiences that his work is leading up to. Practising surgeons, and especially those who have not had a long apprenticeship in anatomy, require help in preparing clinics and at the operating table, and can find little that is inspiring in the anatomy text-books.

The chief feature of Mr. McGregor's volume is that all the information is useful. Because it is small it cannot be exhaustive, but nothing is contained therein that does not find some application in practice. The illustrations by Doctor Thomas are alone worth a perusal of the book. For simplicity and effectiveness they can hardly be improved upon, although it must be said that it is rather carrying things to an extreme to print the illustration on page 271, in which a caput medusæ is depicted as a circle with radiating lines. A diligent search is necessary to find the few details for adverse criticism. The description of the origin of the superior constrictor muscle of the pharynx is not quite accurate. Collar-stud abscess of the palm of the hand is generally described as a subepithelial and a subdermal collection of pus with a small communication, and not as a perforation of the palmar fascia. It also might be felt that the description of the anatomy of snapping-jaw might with benefit be made more complete in view of the modern advances in this subject. It is with much difficulty that these small defects have been found and

the volume can be highly recommended. The nomenclature follows the B.N.A. and there is a good index.

History of Dermatology. Wm. Allen Pusey, A.M., M.D., LL.D., Prof. of Dermatology (Emeritus), University of Illnois. 233 pages, illustrated. Price $3.00 postpaid. Charles C. Thomas, Springfield and Baltimore, 1933.

As Doctor Pusey remarks, skin diseases have always been apt to obtrude themselves on the attention more than have other afflictions, and one therefore finds dermatological references in the very earliest medical records. So that while dermatology has developed into a specialty only in comparatively modern times, it is not difficult to separate its early history from other medical subjects. Indeed, the fact that skin diseases have filled so large a part of medical writings in general should comfort those who like to feel that, while they are not dermatologists, they still can understand and treat many skin affections which occur as manifestations of general bodily states. Doctor Pusey's History soon convinces one, however, of the inevitability of dermatology becoming a specialty. We are too apt to forget that the skin is a specialized organ, and one whose full understanding introduces us to anatomical, physiological, chemical and pathological problems. Under Doctor Pusey's rapid guidance we learn of the men who have approached and elucidated these problems, even if they have not altogether cleared them up. His account is interesting and should command a wide audience.

Handbook of Experimental Pathology. George Wagoner, M.D., Associate in Pathology and R. Philip Custer, M.D., Associate in Research Pathology, School of Medicine, University of Pennsylvania. 160 pages, illustrated. Price $4.00. Charles C. Thomas, Springfield and Baltimore, 1932.

The book under consideration is a practical manual of experimental pathology, and, as indicated by Prof. E. B. Krumbhaar, of the University of Pennsylvania, in his Foreword, probably the first of its kind in English. The book is divided into three parts: Surgical technique and experimental methods; Experiments in general pathology; and Experiments in special pathology. The first part contains descriptions of general operative technique, the post-operative care of animals and the normal blood findings in laboratory animals. The experiments in general pathology comprise circulatory disturbances; degenerations, infiltrations and pigmentations; inflammation; regeneration and repair; infection and immunity; experimental tumours. In the section on special pathology experiments are suggested under the following headings: cardio-vascular system; hæmolytopoietic system; reticulo-endothelial system; respiratory system; gastro-intestinal system; genito-urinary system; skeletal system; endocrine system; vitamins; hypersensitivity. From this short review of the contents it may be seen that the book provides practical exercises in almost all branches of pathology. The experiments selected by the authors serve well to demonstrate the points under discussion. In general they are not too difficult for students, although most of them require a solid knowledge of physiology and a good preliminary training in practical mammalian physiology, as well as the help and supervision of an experienced teacher. (It is not quite clear at what stage exactly the students of the University of Pennsylvania take this course; in the preface the authors mention only that the course in Experimental Pathology is given to the second-year students of medicine.) References are given after many of the experiments which enhance the value of the book.

In connection with the publication of Wagoner and Custer's book another point might be mentioned. It seems that the time is approaching when pathological anatomy will be separated from experimental pathology, just as in last century normal anatomy was set apart from physiology, to the advantage of both sciences. This does not mean of course that the morphologist should be ignorant of the functional aspect, nor the physiologist of the anatomical, but such a separation will encourage specialization and hence will advance both branches of pathology. The book under review shows clearly the importance of "Experimental Pathology" as an independent branch of medical science.

The Relative Value of Radiotherapy in the Treatment of Cancers of the Upper Air Passages. W. Douglas Harmer, M.A., M.B., F.R.C.S. 85 pages. Price 6/. John Murray, London, 1932.

In this lecture, now issued in book form, Mr. Harmer gives details of treatment and results in radiotherapy for malignant growths of the upper air passages in his own clinic and elsewhere. He strongly emphasizes the need for early diagnosis, insisting that no cancer case be placed on the waiting list. Warning is given of the danger of damaging these growths by biopsy or partial operation. He favours increased thickness of filter in order to avoid œdema, perichondritis and late reactions. He considers the choice of treatment a difficult problem, and says that surgery, diathermy, radiation, or a combination of these, should be chosen, the interest of the patient being paramount. Mr. Harmer has had very good results in the radiation of intrinsic cancer of the larynx, the needles being applied through a fenestrum in the thyroid cartilage. In other portions of the upper air passages his results, except in cases of carcinoma, correspond to those of other radiologists. In this group, large numbers of inoperable cases were treated, hence the higher death-rate.

The author concludes that there is a great future for radiotherapy if the treatment clinic is properly handled, richly endowed, vigorously supported, and staffed by groups of expert specialists. He doubts the wisdom — certainly the prudence — of any surgeon employing radium without the help of a group of experts. He is certain that the patient should not be handed over to the pure radio-therapeutist who has no clinical knowledge of the disease under treatment. He urges authorities to exert their powers to prevent renting agencies from loaning radium to anyone except a recognized expert. He counsels the younger radiologists to endeavour to perfect the art of radiotherapy until the time comes when they may be able to say with Pasteur, "that they have contributed to the progress and good of humanity".

Materia Medica, Pharmacology and Therapeutics. Walter A. Bastedo, Ph.G., M.D., Sc.D., F.A.C.P., Assistant Clinical Professor of Medicine, Columbia University, etc. Third edition reset. 739 pages, illustrated. Price $7.00. W. B. Saunders, London and Philadelphia; McAinsh & Co., Toronto, 1932.

In this edition the author has kept in mind the progress of drug therapy, and his appointment as president of the Pharmacopœial Convention of the United States denotes a close contact with the development of the more rational side of medical treatment. The book is of special interest to Canadians because of the prominence given to the work of our pharmacologists and physiologists.

There are three main divisions of the subject matter. The first has to do with the general consideration of the effects of drugs and their methods of use. The second and larger section deals with the individual remedies, and the third is a short section on prescription writing.

In general, the author presents a full account of the pharmacological action of the various drugs, with a much more restricted reference to their therapeutic uses. From the practitioner's point of view, therefore, the book will be more valuable for occasional reference than for constant use. For the medical student, however, pharmacology is covered in a very satisfactory manner. The section on prescription writing will commend itself to student and teacher alike. New material has been

added on the adrenal cortex, ephedrine, plasmochin, yatren, the therapeutic uses of carbon dioxide, the dyestuffs, and the various tissue extracts. The toxic effects of the cincophen group upon the liver are quite adequately dealt with, but the actual application of liver therapy to the control of pernicious anæmia receives but scant attention. Again, it might be suggested that alcohol and its preparations, medicinal and popular, and also tobacco, receive more attention than is their due. The section on thyroid disease and the use of iodine in thyroid disorders is excellent, as is also the warning against the indiscriminate use of thyroid preparations.

The book may be recommended, therefore, as a pharmacological text, but from the therapeutic standpoint it suffers from those disadvantages which are inherent in any work in which the broad principles of treatment are hampered by a close association with the action of individual drugs.

Aids to Materia Medica. George H. Newns, M.B., B.S., M.R.C.P., late House-Physician and Assistant to the Children's Dept., Kings College Hospital, etc. VIII and 141 pages. Price $1.10. Baillière, Tindall & Cox, London; Macmillan Co., Toronto, 1933.

This useful little work is compiled with the object of assisting medical students reading for their examinations in materia medica and pharmacology, and also with the hope that it will be of value to those preparing for their finals. We may say at once that it adequately fulfils the purpose of its author. Part One is taken up with necessary definitions, and such subjects as the modes of administration of medicines, active principles, prescribing, incompatibility, the times for administration of medicines, toleration, idiosyncrasy, cumulative action, and habit. The main body of the book deals with the common drugs, their composition, preparations, doses, and pharmacological action. Similar drugs and drugs with similar actions are grouped together. Glandular preparations, vaccines and antitoxins are also briefly dealt with. The third section consists of lists of preparations, followed by a grouping of drugs according to their action. Appendices are given, dealing with the imperial and metric systems and the drugs having a dosage of less than one grain. In a few cases the therapeutic action of various agents is given. Those who master this book may rest assured that they have a useful working knowledge of the more important drugs and therapeutic agents. As the information supplied is based on the British Pharmacopœia of 1933 it is accurate and up to date. The book may be cordially recommended to those who wish to brush up their knowledge quickly and as a work of reference.

Extra-pharmacopœia of Martindale and Westcott. Twentieth edition revised by W. Harrison Martindale, Ph.D., Ph.Ch., F.C.S. Vol. 1. 1216 pages. Price 27/6 net. H. K. Lewis, London, 1932.

This storehouse of concentrated knowledge continues to keep up its high standard. It is surprising how completely the literature is sifted and the essential advances recorded in such a comparatively small compass.

Management of the Sick Infant. Langley Porter, B.S., M.D., M.R.C.S., L.R.C.P., Professor of Clinical Pædiatrics, University of California Medical School, etc., and William E. Carter, M.D., Instructor in Pædiatrics, University of California Medical School. Fourth revised edition. 763 pages, illustrated. Price $9.50. C. V. Mosby Co., St. Louis; McAinsh & Co., Toronto, 1932.

This book is much more comprehensive in its scope than its title would imply. It covers not only the common disorders of the infant but practically the whole field of the practice of medicine in the young child. It is not a text-book, in that it does not delve very deeply into the history, etiology, or pathology of disease in the infant and young child. It is essentially a book for the practitioner, whether he be a general practitioner or a specialist in the field of pædiatrics. All the conditions are clearly described, losing nothing in the brevity, almost terseness, of their description. The outlines of treatment are at times dogmatic, and perhaps occasionally leave room for argument, but are apparently sincere and obviously inspired by the authors' own experience.

Special commendation should be given to Part 3, in which the writers describe most succinctly every method used in practice, both for diagnosis and treatment. Nothing is omitted, from the taking of the temperature to the puncture of the cisterna magna; from the preparation of any and every kind of feeding to the application of a mustard plaster. Many well-taken photographs illustrate these methods. It really is a most useful work for the practitioner who wishes to find help easily and quickly or to refresh his mind on methods of procedure.

Hospitals and Child Health—Hospitals and dispensaries; Convalescent Care; Medical Social Service. 278 pages. Price $2.50. The Century Co., New York, 1932.

This publication of the White House Conference contains the reports of three sub-committees, each one dealing with one phase of the sub-titles of the book. The first section surveys the situation that exists. Thirteen per cent of the accommodation in hospitals is for children, if bassinets are included. This is a percentage below that of the child population. Less than half the hospitals in the United States have a children's service. It is surprising to read that mental diseases and contagious diseases are viewed as "a distinct menace to other patients." In only 15 per cent of the hospitals with an obstetric service is a pædiatrician in charge of the new-born. Only one-quarter of the general hospitals have a social service department. There are 70 children's hospitals with a bed capacity of 6,597. Posture clinics are held in only a small percentage of orthopædic hospitals or dispensaries. The conclusion is that there are enough beds, but most hospitals "show no disposition to have these beds definitely controlled by a pædiatric staff." A plan is outlined for improving convalescent care and medical social service.

This volume is a valuable compilation of information, and offers constructive suggestions which are of value to those engaged in or interested in the fields of service covered by the report.

Growth and Development of the Child. Pt. III. Nutrition. Report of the Committee on Growth and Development, Kenneth D. Blackfan, M.D., Chairman. White House Conference on Child Protection. 532 pages. Price $4.00. Century Co., New York and London, 1932.

The Committee responsible for this volume had as its objective an appraisal of existing knowledge, and, at the same time, to point out the obstacles to normal growth and development which result from disease and social conditions. A collection of material on the subject of nutrition is presented which is not available elsewhere. Nutrition has a qualitative and a quantitative aspect. It is in the quantitative that the child differs from the adult. ". . . too great admiration of the vitamins has, at least in the popular mind, prevented proper appreciation of the indispensability of a long list of other food substances."

Present-day enthusiasm for rapid growth is questioned, as it may not mean optimal growth. The importance of a mixture of proteins in the ration is dilated upon, as are the lack of cereals in essential amino-acids and the remarkable efficiency of milk proteins in meeting the demands of growth. It is stated that "it does not seem likely that high protein

feeding in children plays any rôle in the causation of nephritis."

In the chapter on Fat, the prejudice against pastry and dried foods is referred to, and it is stated "So far as directly harmful effects are concerned, it certainly remains to be proved that pie, cake, fried fish, meat or eggs are either poorly digested or poorly assimilated."

The sections on vitamins are well presented. Minerals are said to be "utilized by the body just as well whether furnished as inorganic salts or in organic complexes." The sections dealing with the various mineral constituents of the diet are excellent. It is interesting to note that the so-called hardening process is condemned, as excessive habitual heat loss due to insufficient clothing may retard growth.

The choice and preparation of foods, eating habits, etc., are all adequately dealt with. This book is, on the whole, excellent and is highly recommended.

Nutrition Service in the Field and Child Health Centres. A Survey. Reports of Sub-Committees of the White House Conference on Child Health and Protection. 196 pages. Price $2.00. The Century Co., New York, 1932.

Two separate studies are included in this one volume. The nutrition study covers the work that is being done by nutritionists, and the relation of this work to public health and to public health workers. The nutritionist's "major activities are directed towards the furtherance of good nutrition in public health and community welfare programs through education." The examples given of nutrition service are well selected and most informative. The survey of Child Health Centres is a valuable compilation of the organization, methods and practices of the 1,511 health centres in the United States. This volume can be recommended to those who are interested in nutrition, public health, and community welfare services.

The Child and the Tuberculosis Problem. J. Arthur Myers, Ph.D., M.D., F.A.C.P., Professor of Preventive Medicine, University of Minnesota. 230 pages, illustrated. Price $3.00 postpaid. Charles C. Thomas, Springfield and Baltimore, 1932.

This book belongs to the class of literature known as "popular science." The subject with which it deals is a specially favourable one for discussion from the general point of view, and it is only to be expected that there should be many attempts to do so. Dr. Myers speaks with an unusual width of knowledge and should command the attention of a large lay audience. At the same time, the book has considerable value for the practitioner. In spite of all the incessant teaching and preaching on tuberculosis, modern views on the course and transmission of the disease are still surprisingly slow in penetrating and influencing many medical men. The idea that tuberculosis is inheritable has not yet been fully replaced by the view that it is directly transmitted. The view that pulmonary tuberculosis in infants and children is always fatal is only gradually being modified by the increasing records of recovery from acute pulmonary lesions even at these tender ages; although it was unfortunately thought necessary to conceive the anomalous term of epituberculosis to describe the condition. These and many other points are dealt with by Dr. Myers in a simple and informative manner.

Ernährung und Diät Bei Tuberkulose. (Nutrition and Diet in Tuberculosis). Prof. Dr. Med. Adolf Bacmeister and von Dr. Med. Paul Rehfeldt. 187 pages. Price RM 14.75. Theodor Steinkopff, Dresden and Leipzig, 1932.

This little volume gives a brief review of the subject of normal metabolism and of the alterations known to occur in tuberculosis. The relationship between constitution and tuberculosis is considered, the various types of constitution and the susceptibility of each to disease being described in considerable detail. A chapter is devoted to the nature of the food elements and their utilization with particular reference to minerals and vitamines. The general principles governing the diets of tuberculous patients are outlined, and chapters given on the feeding of emaciated and of obese patients. These are sensible, but offer nothing new or outstanding. The use of insulin to increase appetite and promote the utilization of carbohydrate is outlined and is of interest. Chapters on the diet in abdominal tuberculosis and in kidney disease complicating tuberculosis are included for the sake of completeness. The chapter on Diabetes and Tuberculosis is interesting chiefly because it emphasizes the possibility of focal reactions resulting from the introduction of the foreign protein contained in the insulin. The use of Synthalin B as a partial substitute for insulin is discussed.

Possibly the main value of the book lies in the collection of Tables which include those of Harris Benedict for the determination of normal basal caloric requirements, Tables of food values, and Tables of the mineral and vitamine content of foods.

Cancer: Civilization: Degeneration. The Nature, Causes and Prevention of Cancer, especially in its Relation to Civilization and Degeneration. John Cope. 310 pages, illustrated. Price 15 s. H. K. Lewis & Co., London, 1932.

The author begins with a statement that whereas certain diseases are on the decrease, others are on the increase. "In an ascending scale, idiots, imbeciles, mental defectives and dull-witted have all gone up in numbers both actually and relatively, since the days of Queen Victoria." For these and other similar statements, no satisfactory proof is offered.

The pre-disposing causes of cancer are given as: inadequate use of the digestive organs, the reproductive system in women, and embryonic "rests". Heredity is mentioned as a strong liability or susceptibility. It is stated that cancer is rare among wild or semi-civilized people. The elements in civilization which cause cancer are given as: new forms or irritants; a larger proportion of the aged; disuse or too little use of important organs, increasing the sensitiveness to degenerating agents of the part. Actual causes: "The toxin of the *influenza microbe* or microbe (*sic*) is thought to be one of the chief. Those implied in chronic bronchitis, fibroid pneumonia and syphilis are also suspected. Then the stimulating fumes and dust which arise from petrol combustion and from tarred roads are by many regarded as important. Tar is known to be a potent cause of cancer, and it has been proved that cancer of the lungs may be produced by irritating dust of cobalt and bismuth mines." The author's belief in the hereditary factor is shown by a quotation with regard to tuberculosis "the power of hereditary resistance against the attacks of the tuberculosis bacillus are (*sic*) paramount, and that no matter how heavily such people are assaulted by the bacillus, their bodies will resist them."

The author condemns all modern methods of child care; "under-nourishment is favoured by the custom of giving water to the suckling baby, as if nature has not supplied all the water that is needed," and "its delight in up-and-down dancing movements and in the side-to-side movements of rocking is severely repressed." It is surprising to read that bran supplies "a valuable phosphorus compound and brain food much needed in these days." In dealing with sex repression, the author states "Within the space of a generation, from the male and female of Victorian days, there has evolved a third, more neutral or middle sex." This seems to be a remarkable occurrence all within one generation.

This book might well be read in conjunction with the report of the Royal Commission of Ontario.

Anthropology and Modern Life. Franz Boas, Ph.D., Professor of Anthropology, Columbia University, and President of the American Association for the Advancement of Science. New and revised edition. Price $3.00. W. W. Norton & Co., New York, 1932.

The science of anthropology affords aid in the interpretation of modern life, and may be of value in the solution of its practical problems, as those of education, of nationalism, and of criminology. Anthropology considers man as a member of a racial or social group, in contrast to anatomy, which deals with the individual as a type. It presupposes a knowledge of anatomy, physiology, psychology and other ancillary sciences, and is concerned with the distribution of form, function and behaviour in the group. In considering the problem of race the author notes that modern races are "domesticated" forms — not wild. Cooked food and tools have wrought great modifications in man. Among the traits that may be due to domestication are excessive reduction of the face in some white types, and elongation of the mouth parts in the negro. Primitive peoples are not proved to have unusually keen sight or hearing, but train these faculties in special directions. Dialect, which implies a peculiar uniformity in articulation, does not depend on anatomical uniformity, and, indeed, occurs always in anatomical heterogeneity, and the same may be said of many habits and customs. Racial characters, as skin-pigmentation, eye-colour, hair-form, brain-size, and the structure of the nose, lip, etc., are determined by heredity and all members of the race participate in them. Larger brains are found in the larger bodies, but they are not necessarily more complex, and racial identification of a brain is impossible.

Under the chapter heading "nationality" he notes that this embraces individuals of many different types. Although Europe contains many nationalities, people of a pure racial type are not found in any part of it. Populations have become inextricably intermingled. Community of language is a certain background of national life, but only in a relative sense. Disharmony may exist in its presence, and harmony in its absence. Switzerland, for instance, presents harmony although there is a plurality of language. A nationality is thus a community of emotional life, and relies not alone on bonds of blood or language. He advocates the federation of nations, and thinks their aims may be unified. He believes that the settlement of the world war was a setback, as it split up previously intact groups, such as Austria-Hungary. He feels that our educational system should teach cultural nationalism rather than political nationalism, which encourages rivalry and hostility among the nations. We should have ideals of international duty.

The author thinks that in practical anthropology the scope of eugenics is limited, since eugenic selection can affect only hereditary features, the field of which is closely restricted. He admits the possibility of segregating good qualities and eliminating undesirable ones. Complete rationalization of human life is unattainable. The urges of procreation, for instance, are ineradicable. If we are to select human types, what shall we select? Are we to aim for human beings well equipped for the expression of logical reactions, or of emotional reactions? The idea of creating the best human type by selective mating is, he thinks, not practical, and it would seem unwise to fix the type. Defectives cannot be eliminated, for many are due to environmental conditions. He is pessimistic as to the value of eugenics, and thinks that enforcement of its doctrines would destroy society. The ideal is unattainable.

The Sputum, its Examination and Clinical Significance. Randall Clifford, M.D., Associate in Medicine, Peter Brigham Hospital. 167 pages, illustrated. Price $4.75. Macmillan Co., New York and Toronto, 1932.

An excellent survey of the general characters of sputum, its clinical significance, and methods of examination.

BOOKS RECEIVED

Aids to Biology. R. G. Neill, M.A., Biology Master, The Grammar School, Burton-on-Trent. 257 pages. Price $1.10. Baillière, Tindall & Cox, London; Macmillan Co. of Canada, Toronto, 1932.

Surgical Clinics of North America. Vol. 12, No. 6. By leading surgeons. 300 pages, illustrated. Issued serially, every other month. Price $18.00 (6 numbers). W. B. Saunders, Philadelphia and London; McAinsh & Co., Toronto, 1932.

Shorter Orthopædic Surgery. R. Brooke, M.S., F.R.C.S., Hon. Orthopædic Surgeon, Royal West Sussex Hospital. 150 pages, illustrated. Price $3.00. John Wright & Sons, Bristol; Macmillan, Toronto, 1932.

Introduction to Social Science for Health Visitors. Evelyn Wilkins, B.A., Head of Dept. of Hygiene and Public Health at Battersea Polytechnic, London. 128 pages. Price $1.20. Edward Arnold & Co., London; Macmillan, Toronto, 1932.

Standard Classified Nomenclature of Disease. Compiled by National Conference on Nomenclature of Disease. Edited by H. R. Logie, M.D., C.M., Executive Secretary. 699 pages. Price $3.50. Commonwealth Fund, Division of Publications, New York, 1933.

Textbook of Surgical Nursing. Frederick Neef, B.Sc., M.L., M.D., F.A.C.S., Attending Surgeon, St. Elizabeth's and Misericordia Hospitals, and New York City Cancer Institute. 173 pages, illustrated. Price $2.25. Lea & Febiger, Philadelphia, 1933.

Pictorial Midwifery. Comyns Berkeley, M.A., M.C., M.D., F.R.C.P., F.R.C.S., F.C.O.G., Consulting Obstetric and Gynæcological Surgeon to Middlesex Hospital, etc. Second edition. 172 pages, illustrated. Price $3.00. William Wood, New York, 1932.

Syphilis des Herzens und der Gefässe. Prof. Dr. Ed. Stadler, Leitender Arzt der Inneren Abteilung des Stadtkrankenhauses Plauen. 82 pages, 8 illustrations. Price RM. 6.50. Theodor Steinkopff, Dresden and Leipzig, 1932.

Neue Gedanken Uber Das Blut—Und Nieren-Problem. Kurt Bergel. 92 pages, illustrated. Price RM. 3. Deutsches Verlagshaus, Bong & Co., Berlin and Leipzig, 1932.

Ante-natal Care. W. F. T. Haultain, O.B.E., M.C., B.A., M.B., F.R.C.S.E., M.R.C.P.E., M.C.O.G., Senior Assistant Obstetric Physician, and E. Chalmers Fahmy, M.B., F.R.C.S.E., M.R.C.P.E., M.C.O.G., Assistant Obstetric Physician, Edinburgh Royal Maternity Hospital, etc. Second edition. 127 pages. Price $2.25. William Wood & Co., New York, 1933.

Final Report of the Commission of Medical Education. 560 pages. Price $2.00. Published at: Office of Director of Study, 630 W. 168th St., New York, 1932.

Organs of Internal Secretion. Ivo Geikie Cobb, M.D., M.R.C.S. Fourth edition, 303 pages. Price $3.00. Baillière, Tindall & Cox, London; Macmillan, Toronto, 1933.